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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

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SUMMARY OF RECENT ABSTRACTS.*

I. CHOLERA.

Bacteriology.

VENKATARAMAN (p. 139) confirms previous work by showing the existence of vibrios of the El Tor type in natural waters in the Madras area. The eight strains now reported were recovered from water tanks in a district in which earlier attempts had failed. [It will be remembered that in India the El Tor vibrio has repeatedly been found in water in areas entirely free from cholera, and that there is no evidence that, in India, this vibrio is aetiologically related to any cholera-like disease, though such a connexion has been reported in Celebes.]

PANJA (p. 241) has found that vibrios in the stools of cholera patients will grow through an L3 filter candle into surrounding peptone water much more quickly than organisms such as *Bact. alkaligenes*, motile coliforms and late lactose-fermenters. He has put this finding to use in the isolation of cholera vibrios by mixing a small amount of stool with peptone water, and partly aspirating it, by vacuum action, through the candle into the surrounding peptone water. He has also found that boric acid to a strength of 0·08 per cent. in the peptone water (subsequently adjusted to *p*H 9) inhibits coliforms, but not the vibrios. This method gave 87 per cent. of successful isolations against 44 per cent. by direct bile-salt agar plating.

In a study of the pathogenic effects of vibrios injected subcutaneously into guineapigs, PANJA & PAUL (p. 909) has shown that *V. cholerae* and non-agglutinable vibrios (from a case of cholera) invade the general circulation within about two hours, but that vibrios from the water of the Hooghly river do not invade so early. Nevertheless, all these vibrios are capable of killing the animals. No distinction between these vibrios can be made by feeding in guineapigs or by intravenous injection in rabbits. [It does not appear that these animal tests are likely to be satisfactory in the differentiation of vibrios.]

GALLUT (p. 910) has obtained, from cultures of *V. cholerae*, a toxin which contains both glucolipidic and protein fractions. If it be accepted

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1943, v. 40. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

that endotoxin is of glucolipidic, and exotoxin of protein composition, the author claims that both are present in the toxin he has prepared.

Clinical Findings.

PANJA *et al.* (p. 140) have isolated vibrios from a single specimen of vomit of cholera patients in 26 of 52 cases so examined. In some cases the *p*H of the vomit was below 5, and when this was so isolation failed. More commonly a *p*H of 6·0 to 7·5 was encountered and vibrios were frequently isolated; at a *p*H of 7·0 to 8·4 isolation was successful in 12 of 14 examinations. Thus, the more alkaline the vomit the better the chance of success. Direct plating on to bile-salt agar, and enrichment in peptone water were carried out; both methods should be used since either may give a positive result when the other is negative, but direct plating is the more commonly successful procedure. Of the 26 strains isolated, 11 were agglutinable (Inaba or Ogawa), 5 were non-agglutinable, and 10 were lost before typing. Discrepancies were occasionally found between the vibrios from vomit and from the stool of the same patient; more work is to be done on this subject.

It has been observed that in convalescents from cholera the gastric acidity is consistently low; it has not been clear whether this is an effect of cholera or whether cholera attacks especially those with low acidity. NAPIER and GUPTA (p. 539) have examined this question, and in experiments with cultures of cholera vibrios exposed to the action of samples of gastric juice of different ranges of free and total acidity, have found that the vibrios are killed very rapidly when the degree of acidity is such that 22 cc., or more, of N/10 NaOH are required to neutralize 100 cc. of the gastric juice. In the absence of acid, however, the vibrios may survive up to 15 days. The authors conclude that the action of free hydrochloric acid is so fatal to the vibrio that a person with low-acid gastric juice may be much more susceptible to cholera infection than one with a normal or high acid content.

Treatment.

In an account of the outbreak of cholera which occurred in Hong Kong during the period 1937–1940, WILKINSON (p. 843) raises important points in treatment. He states that hypertonic saline had not been proved to be demonstrably efficacious, and claims that it might be the cause of acute toxaemia by causing fluid from the intestine to be drawn into the circulation. [This view may be compared with that of BANERJEE below, who thinks that the effect of concentrated salt solution is to withdraw interstitial fluid from the tissues into the blood stream.] Wilkinson refers to the two great dangers to life in cholera, hyperpyrexia during the stage of reaction, and anuria. He gives instructions on the treatment of hyperpyrexia. [It will be remembered that PASRICHA *et al.* (this *Bulletin*, 1942, v. 39, 166) attribute much of the hyperpyrexia which follows intravenous infusion of saline to pyrogenic substances, usually split proteins derived from bacteria, present in the solution injected. PANJA *et al.* (this *Bulletin*, 1942, v. 39, 839) claim that elimination of these pyrogens greatly reduces the incidence of febrile reactions. (See also CO TUI and WRIGHT, below.)] For anuria Wilkinson advocates intravenous bicarbonate-saline, hot rectal salines and cupping of the loins.

BANERJEE (p. 454) contends that in cholera (as in burns, pyloric obstruction and other conditions) hypochloraemia is a much more important factor than the loss of fluid. He reports that the intravenous injection of 50 cc. of a 20 per cent. salt solution rapidly lowered the specific gravity of the blood in five patients, being equivalent, in effect, to 3 pints of ordinary hypertonic saline. This result appears to be due to the drawing of interstitial fluid into the circulation. Normally the proportion of interstitial fluid to blood fluid is 3 to 1.

It is known that patients receiving hypertonic salines are prone to rigors and pyrexia, and that these effects are commonly due to bacterial proteins dissolved in the saline. Various methods of preparing solutions free from these pyrogens have been described, and CO TUI and WRIGHT (p. 140) advocate filtration through asbestos pads calibrated so that they hold back a standardized pyrogenic substance (prepared from a Berkefeld filtrate of a typhoid vaccine) to such a degree that a febrile reaction is not provoked when the filtrate is injected into experimental animals.

CHAPMAN (p. 454) has observed that, when rabbits are used for detecting the presence of pyrogenic substances in fluids for intravenous injection, a rise in temperature is closely correlated with a reduction of 4,000 or more in the circulating leucocytes. The conclusion arrived at is that in the absence of this leucopenia after injection, the solution tested may be regarded as free from pyrogens.

SADUSK and OSWALD (p. 843) have investigated the bacteriostatic and bactericidal action of certain sulphonamides on *V. cholerae* in a synthetic medium which has no power of inhibiting the action of the drugs. Sulphathiazole is bacteriostatic in a concentration of 0·1 mgm. in 100 cc., and is much more active than sulphadiazine, sulphaguanidine and sulphanilamide. It may, however, be too readily absorbed from the intestine to be useful in the treatment of cholera, and for this reason sulphaguanidine may be preferable, since a concentration of 200 mgm. per 100 cc. may easily be attained in the stools.

Prevention.

PANJA and GHOSH (p. 910) have studied the action of potassium permanganate on *V. cholerae*, non-agglutinating vibrios and other organisms, in the presence of organic matter. In pyrogen-free water it is lethal to *V. cholerae* at a dilution of 1 in 10^6, but in the presence of organic matter a concentration of 1 in 5,000 may be necessary. *Bact. typhosum* is not so easily killed; nevertheless, the authors state that "fruits and vegetables artificially infected with cultures of *V. cholerae*, *Bact. typhosum* and *Bact. flexneri* can be effectively disinfected by soaking them in permanganate solutions of 1/5,000 to 1/10,000 dilutions for five minutes."

[These findings are surprising in view of previous reports of similar work. GOHAR (see *Bulletin of Hygiene*, 1937, v. 12, 582) found that 1 in 1,000 permanganate was not enough to free artificially contaminated vegetables completely from *Bact. typhosum*. BERNARD (see *Bulletin of Hygiene*, 1938, v. 13, 400) concludes that it is impossible to sterilize salad leaves with permanganate without spoiling their appearance. VAN DEN BRANDEN and GEENS (this *Bulletin*, 1940, v. 37, 237) found that lettuce steeped in 5 per cent. permanganate for one hour was not sterilized. In view of these conflicting reports, and of the importance of the subject, it would seem desirable that further tests should be made.]

RANTA and DOLMAN (p. 540) note that cholera vaccine prepared from vibrios killed by phenol produced a better response in O and OH agglutinin titres in rabbits than vaccines killed by heat or formalin. Mice are susceptible to the cholera vibrio, especially when its killing power is enhanced by suspension in mucin, and a mouse protection test, based upon the percentage survival of mice tested with mucinized suspensions, has been suggested. [This would appear to offer a better estimate of the protective power of vaccines than the determination of agglutinin titres.] *Charles Wilcocks.*

MALARIA.

ZUMPT, F.; MINNING, W. Malariabekämpfung in der Ukraine 1942. I. Allgemeines ueber die Malariabekämpfung im Generalbezirk Nikolajew vor und nach der deutschen Besetzung [ZUMPT & MINNING]. **I. A General Account of the Malarial Campaign in the Province of Nikolayev before and after the German Occupation.**] *Deut. Trop. Ztschr.* 1943, May 1, v. 47, No. 9, 205–15. II. Die Malarialage im Gebiet von Cherson [MINNING]. [**II. The Malarious Places in the District of Kherson.**] *Ibid.* May 15, No. 10, 237–41. III. Erfahrungen und Beobachtungen während der *Anopheles*-Bekämpfung im Generalbezirk Nikolajew [ZUMPT]. **III. Experiences and Observations during the Anopheles Campaign in the Province of Nikolayev.**] *Ibid.* June 1, No. 11, 265–83, 17 figs. [Numerous refs.]

The authors were sent to the province of Nikolayev to take over the anti-malarial work of the Russians; they arrived at Kherson, near the mouth of the River Dnieper, on April 30th, 1942, and remained in the district for 4½ months.

They describe the Russian organization and methods which they say were well planned but badly carried out. The Russians had established malaria stations and smaller posts. Each station was directed by a qualified medical malariologist with an assistant and subordinate staff. It was divided into clinical and entomological departments and had a laboratory and a propaganda museum. The clinical department investigated and treated human malaria while the entomological department carried out the usual anti-mosquito work. In some stations aeroplanes were used for applying Paris green to large swamps and ricefields. The stations and posts were closed in winter but the authors decided to keep them open and undertake anti-typhus work during these months.

II. Minning reports on the results of blood-examinations of the population of Kherson and its neighbourhood. Malaria parasites, chiefly *Plasmodium vivax*, were found in 9–10 per cent. of the population, the incidence among adults over 30 years of age being nearly twice that in children under 10.

III. Zumpt describes the anti-mosquito work. The predominant species of Anopheles was *A. maculipennis*; *A. atroparvus* and *A. messeae* were identified from eggs deposited by female *A. maculipennis*. A few specimens of *A. hyrcanus* were also obtained. Among Culicines were *Aëdes caspius*, *A. dorsalis*, *A. flavescens*, *A. leucomelas* and *Culex modestus*.

A short account is given of trials with two aeroplanes received from Germany. Spraying of liquid larvicide was found to be useless and the aeroplane was returned, but the other machine, which was adapted for applying Paris green, was found to be very suitable for the work. *J. F. Corson.*

i. KITCHEN, S. F. & PUTNAM, P. **Morphological Studies of *Plasmodium falciparum* Gametocytes of Different Strains in Naturally Induced Infections.** *Amer. J. Trop. Med.* 1943, Mar., v. 23, No. 2, 163–88, 4 figs. [11 refs.]

ii. —— & ——. **Comparative Morphological Studies of *Plasmodium falciparum* Gametocytes in Variously Induced Infections.** *Ibid.* 189–208, 1 fig.

i. From time to time observers have claimed that strains of *Plasmodium falciparum* from widely separated areas, such as those of Europe and Africa, differ from one another in certain characters, particularly the shape of the gametocytes. These observers have in some cases considered the differences to be such that the creation of a new species of parasite was justified. In other cases the variations have been regarded as of sub-specific value only. With a view to obtaining an accurate estimation of such variations, and their possible use for distinguishing species, the investigations described in these papers were undertaken.

Four strains of parasite from widely separated areas in the Western hemisphere were employed and these were studied in patients undergoing therapeutic malarial infections, produced either naturally or artificially. The gametocytes were first studied and outline camera lucida drawings were made of the 16 types encountered. In addition, fourteen different arrangements of chromatin and pigment were noted and each of these given a number. Similarly, eight different types of pigment and twelve different types of chromatin were numbered according to individual characteristics. Thus by the careful study of any crescent it was possible to give it a formula embracing one or other of the features numbered in the four groups of characters. To carry out the study, 10 or 15 male and female crescents were studied daily for a number of days, in Giemsa-stained thin films. The results of these studies and the various formulae obtained were subjected to detailed statistical analyses. The general results showed that the gametocytes of each strain displayed pronounced diversity as to shape and attributes of chromatin and pigment. This was particularly true of the female gametocytes. Daily mean lengths and widths varied considerably. Male gametocytes always showed a greater mean width, while female gametocytes had a greater mean length. There was a tendency for the length of the gametocytes to vary inversely with the width. The wide intra-strain diversity of attributes of the gametocytes in the four patients indicate the precariousness of any attempt to identify strains on the basis of morphological differences.

ii. In the second paper the study was extended to gametocytes in patients naturally infected and in patients artificially infected, in patients artificially infected with more than one strain, and in one patient naturally inoculated in 1936 and another inoculated with the same strain in 1940. Though it was not possible to set up criteria for

identifying strains, it was possible to define the outstanding characteristics of the gametocytes, which are :—

1. Male and female gametocytes are usually sausage-shaped, not, as ordinarily described, with the form of a crescent.

2. In males the chromatin and pigment occupy both central and outlying zones. Among females they are more likely to occupy the central zone only.

3. Individual pigment in males is diffuse and light, either fine or coarse. In females it is compact and dark and may be annular, but in the case of one of the strains it is likely to be diffuse, coarse and dark.

4. Individual chromatin in males is always diffuse and vesicular and partly enveloped by the pigment. Among females it is compact and vesicular but may be either wholly or partly enveloped.

C. M. Wenyon.

GLASGOW, J. P. & MACINNES, D. G. **Anopheles of British Somaliland.** *East African Med. J.* 1943, June, v. 20, No. 6, 176–9, 1 map.

Anopheles gambiae appears to be the only malaria carrier of importance in British Somaliland. It maintains itself permanently in pools along the stream-beds in some localities (*e.g.* Mandera and Lafer Ug) and in those places there is a low degree of endemic malaria with spleen rates somewhat greater than 50 per cent. At Buramo there is an annual epidemic of malaria when the breeding places are extended during the rains. In most parts of the country epidemics occur only in years of heavy rainfall, when breeding extends everywhere into temporary rain-water pools. *V. B. Wigglesworth.*

GENT, J. C. **Three Cases of Malaria.** *J. Roy. Nav. Med. Serv.* 1943, July, v. 29, No. 3, 208–9.

A paper by J. V. SMITH [this *Bulletin*, 1943, v. 40, 215] on an outbreak of malaria in a cruiser prompted the author to record these three fatal cases of cerebral malaria occurring in sailors during August 1942.

The first patient, a stoker aged 42, had felt unwell for a few days but had not reported sick. On August 16th, on getting out of bed in the morning, he collapsed and was admitted to hospital at 6 a.m. unconscious and breathing stertorously. His rectal temperature was 110°F. A blood film showed subtertian malarial parasites. An intramuscular injection of quinine dihydrochloride, 15 grains, was given, and he was sponged with iced water and fanned. His temperature fell within two hours to below 100°F. but soon rose again, reaching 104°F. At 10·30 a.m. he was given an injection of morphine and hyoscine as he had been very violent since admission. In the afternoon he was given a rectal drip of iced water, 4 pints being retained. At 4 p.m. he became conscious and spoke rationally. At 9 p.m. he was becoming "chesty" and was given oxygen inhalation and sulphapyridine intramuscularly, 1 gm. every four hours. He became steadily worse and died next day at 10.50 p.m. [There is no mention of further doses of quinine.]

The other two cases had been treated for about three weeks for undiagnosed pyrexia ; during this time repeated examinations of the blood had failed to show malarial parasites. In each case the patient again reported sick a few days after the end of this treatment. One of

them, Case 2, a man aged 26, was admitted on August 20th; he complained of severe frontal headache since the previous day, a rigor and a slightly sore throat. His temperature was 104°F. A blood film showed both benign tertian and subtertian parasites. He was given quinine dihydrochloride, first an intramuscular injection of 15 grains, then 10 grains thrice daily by mouth. His temperature varied from 99°F. to 103°F. until August 25th when, at 2·10 p.m., it rose to 110°F. Cold sponging was given but he collapsed and died at 4·25 p.m. [The quinine was apparently retained as there is no mention of vomiting.]

The third patient, admitted on August 21st, was a man aged 31. He complained of severe pain in the head, back and legs since the previous day. His temperature was 103°F. A blood film showed benign tertian parasites. He was given quinine dihydrochloride, 10 grains thrice daily by mouth. Next day his temperature was normal and remained between 99° and 101°F. until the morning of August 25th when it rose to 103°F. At 4.25 p.m. he became much excited and his temperature was 106·8°F. Cold sponging reduced it to 104°F. but at 5·20 p.m. he collapsed and he died at 6·10 p.m. [In this case also there is no mention of vomiting having occurred.]

The author thinks that "though cerebral malaria was the primary cause of death in all three cases, the element of heat stroke cannot be altogether ignored, and the two diseases probably work together in the closest collaboration." *J. F. Corson.*

BREWIS, G. S. **Pernicious Subtertian Malaria resembling Blackwater Fever.** *J. Roy. Nav. Med. Serv.* 1943, July, v. 29, No. 3, 212.

This is a description of a fatal case of subtertian malaria, with symptoms of blackwater fever, in a patient who had never had malaria before and who had taken no quinine. He appears to have become infected on board ship (since he did not go ashore) during a stay of six days in Freetown harbour, Sierra Leone, on his way home from Alexandria. His illness began at sea on about June 25th, 1942, two to three weeks after leaving Freetown; he felt ill and vomited after food but did not report sick. He landed "in this country" on July 1st, did not report sick, and went home where he became very ill with high fever, severe vomiting and delirium. He was admitted to hospital on July 6th as a suspected case of Weil's disease and died on July 9th. *Condition on admission.*—Dehydrated and jaundiced; pulse 120, temperature 99°F.; liver enlarged and tender, spleen not palpable; blood pressure 120/80; blood—erythrocytes 4,000,000, haemoglobin 72 per cent., leucocytes 16,600 (polymorphs 78 per cent., lymphocytes 16 per cent., monocytes 5 per cent.). There was a very heavy infection of subtertian parasites which infected half or more of the red cells, some of which showed three or four ring forms; all forms, from rings to mature schizonts, but not gametocytes, were seen. Urine—acid, deeply pigmented, much albumen, brown granular casts, some leucocytes and erythrocytes. Blood urea—360 mgm. per 100 cc.

Treatment.—Quinacrine (atebrin) 0·1 gm. six-hourly, with alkalis, by mouth; intravenous glucose saline drip infusion.

Course.—His temperature rose to 103°F., vomiting subsided and he took 60 oz. of fluid by mouth and 70 oz. by intravenous drip infusion during the next 48 hours. "The blood picture remained as previously." The excretion of urine gradually diminished, only 32 oz. being passed during his stay in hospital; the last few ounces resembled curry soup.

The blood urea rose to 672 mgm. per cent. A blood count shortly before his death showed 1,600,000 erythrocytes and haemoglobin 36 per cent. He received altogether 0·8 gm. of quinacrine.

Post-mortem.—The kidneys showed much degeneration of the epithelium of the convoluted and collecting tubules; the glomeruli were "cellular" but otherwise normal; blood casts and pigment were present. *J. F. Corson.*

BARTOSHEVICH, Y. N. [**Cases of Infection with Malaria from Transfusion of Stored Blood.**] *Sovietskaja Medicina* [=*Soviet Medicine*]. 1941, No. 2, 32. [From a translation of the original Russian.]

The author records two cases of malaria in children, each due to transfusion of blood from the same donor. The donor had several times been examined for malaria, with negative results, and had, moreover, given blood on several occasions without untoward results. She was, however, a native of a malarial district, and, though there was no history suggestive of previous malaria, had probably harboured a latent infection. The view taken is that this was brought to activity by repeated venesection. After the last withdrawal of blood her spleen, hitherto not palpable, was found to be enlarged, but there were no parasites to be found in her blood. *Plasmodium vivax* was found in the blood of the children infected from this donor. The blood had, in one case, been preserved for three days.

Charles Wilcocks.

BELTRÁN, E. Estudio de cepas mexicanas de *Plasmodium vivax*, en casos de paludismo inducido. [**Study of Mexican Strains of *P. vivax* in Cases of Induced Malaria.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1943, Mar., v. 4, No. 1, 31–48, 6 charts. [16 refs.] English summary.

Details are given regarding 30 patients suffering from neurosyphilis who were submitted to malaria therapy, four different Mexican strains of *P. vivax* being used for the purpose. Varying quantities of infected blood were injected subcutaneously immediately after withdrawal from the donor. In all of the patients parasites appeared in the peripheral blood; the average prepatent period was 9·6 days. Clinical symptoms of malaria developed in 27 of the 30 patients; in 22 the temperature rose above 40°C. (104°F.). The fever was quotidian in nine cases, tertian in eight and mixed in the remainder. The average incubation period was 9·6 days. The four strains differed somewhat in their behaviour but the number of observations was insufficient to warrant any general statements. *Norman White.*

HAUER, A. Malariarezidiv und Serumreaktion. [**Serum Reaction in relation to Relapse in Malaria.**] *Deut. Trop. Ztschr.* 1943, May 15, v. 47, No. 10, 241–7.

The author compared the serum reactions (Wassermann, Meinecke and Kahn tests) in 866 cases of malaria, of which 517 were first attacks and 349 were relapses. The percentage of positive results among the patients with first attacks of malaria was more than ten times as high as in those with relapses. In both classes of patients a positive reaction was found more frequently in the earlier months of the year

than in the later months. Positive reactions were, on the average, weaker in relapse attacks than in first attacks. In relapses a negative serum reaction may be found even after 20 or more attacks of fever; it is not connected with the species of malarial parasite nor with the country where infection occurred, but is attributed to a special constitutional weakness ("Anergie") of the individual who suffers relapses. *J. F. Corson.*

MUKERJI, B., GHOSH, B. K. & SIDDONS, L. B. **The Search for an Anti-Malarial Drug in the Indigenous Materia Medica. Part II.—** *Caesalpinia bonducella,* **Fleming.** *Indian Med. Gaz.* 1943, June, v. 78, No. 6, 285–8.

"An alcoholic extract of *C. bonducella* nuts (fat-free powder prepared from the kernels) when fed in a dose up to 400 mg. per gm. body-weight failed to arrest the normal multiplication of *P. gallinaceum* in domestic fowls; moreover the parasite showed no change in morphology. Mepacrine hydrochloride (atebrin) synthesized by local manufacturers in Calcutta produced both these effects. These results do not encourage tests with 'nata' on other malarial infections—animal or human. It appears unlikely that 'nata' has any specific action in malaria." [See this *Bulletin*, 1943, v. 40, 670.]

GORGAS MEMORIAL LABORATORY ANN. REP., 1942 [CLARK, H. C., Director]. 7–14. **Experimental Work in Control of Malaria by the Use of Drugs.**

The 10-year programme of experimental study of malaria control by the use of either atebrin or quinine in villages in the mid-basin of the Chagres River in Panama was concluded in 1940. [Summaries of the annual progress reports appeared in this *Bulletin*; that of the 10th and final report in 1941, v. 38, 511.] The work had shown that in places in which it is not feasible to apply satisfactory antimosquito measures the use of quinine or atebrin can secure good "business control" of malaria and improvement in general health. But, though the transmission of malaria can be lowered to some extent, it is not possible by these means to secure the eradication of the disease and the prevention of relapse.

Since the completion of the study programme, surveys of the villages have been continued and the results of these surveys are summarized in this communication. In the treated villages blood film surveys were carried out every second month, instead of monthly as in the experimental period. Persons harbouring parasites were given atebrin 0·1 gm. thrice daily for five days, or, in the quinine group of villages, 18 grains of quinine sulphate in tablet form, each day for five days. The use of plasmoquine simplex was discontinued; it had not lowered the transmission rate to any appreciable extent. Control groups in the towns of Rio Pescado and Mendoza were surveyed once a month; the names of persons harbouring parasites were given to the school teachers who gave quinine to any who asked for it. Only a small amount of quinine was demanded.

The average monthly parasite rate for the atebrin-treated population was 15·4, and for the quinine-treated population 12·1. Both rates

were higher than for the previous year, an increase probably due to the return of workers from rural labour camps. The average monthly parasite rate of Rio Pescado was 25·8, and of Mendoza, the other control town, only 7·4. Mendoza owes its relative protection to the facts that it is three miles from the lake, and 300 feet above it, and its farmhouses are dispersed in the hills. As in previous reports detailed information is given regarding the species of malaria parasites found, gametocyte carriers, the age incidence of infection, and the intensity of infections. The year's work confirmed the conclusions, drawn from the prolonged inquiry, which have been mentioned above. *Norman White.*

LEVENSON, E. D., FASTORSKAYA, E. I., KHOVANSKAYA, A. I. & DUKHANINA, N. N. **Experiences in the Control of a Malarial Focus in the North (Archangel Region) by Mass Chemoprophylaxis and Systematic Treatment of Malaria Patients (Russian).** *Med. Parasit. & Parasitic Dis.* 1943, v. 12, Pt. 1, 23–38. [In Russian.]

In the Archangel region of Northern Russia the peaks of malarial incidence are at the end of May and in early autumn (end of July to September). In the period 1935–1938 considerable numbers of cases were observed, *e.g.*, in the Krasnoborsk sub-district alone, 1,000 to 1,600 fresh infections in the peak month each year. Several thousand blood examinations were made, presumably on the sick : the tabulated results show that in some subdistricts infections with *P. vivax* were more numerous than those with *P. falciparum*, but in others the reverse is recorded. The parasite index in (presumably healthy) children was about 10 per cent. before prophylaxis was instituted.

Mass prophylaxis by acrichin [mepacrine] was instituted in 1939, the details of dosage, etc., being different in different sub-districts ; the dose was generally 0·2 or 0·3 gm. daily for 2–5 days, followed by an interval of 10–12 days, when the course was repeated. This continued throughout the warmer part of the year, generally starting in April. Those known to suffer from malaria were treated by acrichin and plasmocide [plasmoquine], treatment starting early in the year before the disease became epidemic.

The result of the mass prophylaxis was seen in a rapid fall of the parasite index ; in most parts of the area it had been about 10 per cent. in children, and it came down to under 1 per cent. and remained there even during the transmission season. There was a similar gratifying fall in the number of malaria patients, and in the loss of working days from the disease.

[It is very puzzling to read of the present occurrence of much malaria, and of so high a proportion of *falciparum* infections in Northern Russia. We are probably justified in regarding Pavlovskii's " Course on Human Parasitology " (in Russian) as a good authority. In his second edition (1934) Pavlovskii states that north of 60°N. (*i.e.* the latitude of Archangel) there is no reason to believe in the possibility of complete development of *Plasmodium* in *Anopheles*. Even a little further to the south he regards infection as only likely to occur in unusual years when several circumstances simultaneously make it possible. Pavlovskii adds that of course Malignant Tertian is restricted to the centre and south of Russia (as indeed one would have supposed). One can only record these contradictions, hoping that this veil may be lifted.] *P. A. Buxton.*

NEWBOLD, C. E. **A Sea Head for Coastal Swamp Drainage.** *Caribbean Med. J.* 1943, v. 5, No. 1, 30–34, 1 diagram.

The author describes a self-clearing drainage outlet from coastal swamps which have a ground level about that of high tide. This device has worked satisfactorily in Trinidad, where the tidal range is two feet in the neap and four feet in the spring tides, and in Grenada, where tidal ranges are about half those of Trinidad. If there are several drains or lagoon outlets they may be collected into one long reservoir ditch parallel to the shore and one sea drain and head put in the most favourable position. If the outfall can be arranged behind a reef, in quiet tidal water, there is no problem; it will remain clear. Usually a sandy bay is the only place for the discharge. In such conditions the invert at the distal end of the land drain should be six inches above mid-tide level and that drain should have a fall of 1 or 2 in 1,000. The drain ends in a check chamber on the land side of the beach bank. In the check chamber there is a vertical drop of six inches into the sea drain which should have a fall of at least 10 in 1,000. The total fall of the sea drain is one foot. The sea drain ends at a blank wall with an outlet on either side, each one half the width of the sea drain. The outer side of the wall, or sea head, is shaped to turn the incoming waves away from the outlets. The invert of the sea drain is curved. The width of the drain should not be less than two feet and the clearance from the invert to the sea drain cover three feet. Liberal-sized openings in the cover at the sea head and at the check chamber facilitate inspection. *Norman White.*

DAS GUPTA, B. M. & SIDDONS, L. B. **The Effect of Indian-made Mepacrine Hydrochloride on** *Plasmodium knowlesi. Indian Med. Gaz.* 1943, Mar., v. 78, No. 3, 141–2.

With a view to comparing Indian-made mepacrine hydrochloride with atebrin four monkeys with *Plasmodium knowlesi* infection were treated with the former. The daily dose of 0·025 gm. dissolved in 0·5 cc. distilled water was given by intramuscular injection for two or three days. One of the animals, with a heavy infection before treatment commenced, died; the three others recovered. The drug could be seen to have a destructive action on all forms of the parasite, which quickly disappeared from the blood. The course of treatment, though bringing about immediate recovery, did not prevent ultimate relapse. The results correspond very closely with those obtained by CHOPRA and DAS GUPTA (1933) who tested the action of the original atebrin on the same infection [this *Bulletin*, 1934, v. 31, 172].

C. M. Wenyon.

KELSEY, F. E., OLDHAM, F. K. & GEILING, E. M. K. **Studies on Antimalarial Drugs. The Distribution of Quinine in the Tissues of the Fowl.** *J. Pharm. & Exper. Therap.* 1943, July, v. 78, No. 3, 314–19, 3 figs.

The distribution of quinine in the tissues of the fowl is of particular importance because the chicken is susceptible to malaria parasites, and is one of the most common experimental creatures for research in antimalarials. The quinine was estimated by the method of KELSEY and GEILING [*J. Pharm. & Exper. Therap.*, 1942, v. 75, 183]. After

oral administration of 400 mgm. per kgm. there was great variation in the course and height of the blood concentration curve, the peak occurring after three to eight hours and the maximum level ranging from 5 to 25 mgm. per litre. When repeated doses were given, the greater portion of the drug was detoxified each day and little could be found in the tissues 24 hours after the last dose.

When the quinine was given intravenously, 10 mgm. per kgm., the individual variation in the blood curve was much less. For a short time after intravenous injection the concentration of quinine in the red blood cells was slightly higher than in the plasma, but after one hour it was the same or lower. The white blood cells (both of fowls and men) show a concentration of quinine much higher than that of the plasma.

Quinine is rapidly removed from the blood by the tissues and much is eliminated by way of the bile.

Concentration of quinine in the tissues of the chicken, dog and rabbit one hour after the intravenous injection of 10 *mgm./kg. of quinine.*

Tissue	Chicken (av. of 5)	Dog	Rabbit (av. of 2)
	mg. of quinine per kg. of tissue		
Blood	3	3	0·3
Liver	22	23	1
Bile	29	10	5
Lung	13	37	54
Kidney ...	17	14	8
Spleen	21	29	10
Heart	10	8	2
Muscle... ...	5	4	2
Brain	3	3	1

The distribution between the various tissues is shown in the table. The concentrations observed are approximately in inverse ratio to the ability of the tissues of that species to destroy quinine *in vitro*.

F. Hawking.

GEIMAN, Q. M. **Advances in Malaria Research.** *New England J. of Med.* 1943, Aug. 12 & 19, v. 229, Nos. 7 & 8, 283–90 ; 324–32. [143 refs.]

TAYLOR, Frank H. **Mosquito Intermediary Hosts of Disease in Australia and New Guinea.**

This book is reviewed on p. 81.

TRYPANOSOMIASIS.

FAIRBAIRN, H. **The Agricultural Problems posed by Sleeping Sickness Settlements.** Reprinted from *East African Agric. J.*, v. 9, 6 pp.

In this interesting article the author, who is the Sleeping Sickness Officer in the Medical Department of Tanganyika Territory, describes

the methods adopted in forming settlements of natives as a part of the campaign against sleeping sickness, and discusses the problems involved.

Before the country became a German colony the native inhabitants lived in large compact settlements for better defence against their enemies; these settlements were agricultural clearings where comparative freedom from the tsetse fly enabled cattle to be kept. When intertribal warfare had been suppressed by European control, dispersal became safer and families became scattered in the bush; in these conditions the increased contact with tsetse fly prevented cattle from being kept but did not otherwise interfere noticeably with the life of the people. When, however, sleeping sickness appeared and increased to epidemic proportions, comprehensive measures of control became urgently necessary.

Dr. G. MACLEAN, who was appointed Sleeping Sickness Officer to deal with the situation, estimated that a density of population of 5–25 persons per square mile was the most favourable for the epidemic spread of sleeping sickness, but with a density of 50–80 persons per square mile the locality became practically fly-free. Fairbairn agrees with these figures if they refer to families instead of persons, taking an average of 3·3 persons to each family. Such a family cultivates about 4⅓ acres each year.

With 80 families to the square mile each would have 8 acres.

The author states that it has been proved that an epidemic of Rhodesian sleeping sickness cannot be controlled merely by treating infected persons, however thoroughly this is done; it is necessary to reduce the contact between man and the tsetse fly, and this can only be done by the establishment of large compact settlements which are sufficiently cleared of bush to eliminate all tsetse fly from them. This may be done in various ways: (1) the people can be removed to open country; (2) intervening bush between family groups can be cleared so as to form a single area, if there is a sufficiently high density of population; (3) scattered families can be collected and settled in a selected area of virgin bush. The last method has been the one most frequently adopted in Tanganyika Territory and has been successful.

The steps taken to form a settlement are described in detail; they include an estimate of the population, an agricultural survey of the proposed settlement area and assistance in transport, clearing and building. The ultimate aim is to have 16 acres of agricultural land available for each family. The natives are consulted in the choice of land and their co-operation sought. Re-settlement is carried out between August and October, *i.e.* after the harvest and before the next year's farming is begun.

A 15-ton diesel-engined road train was found to be most useful; the aged and infirm and the small children, together with the household goods, were transported to the nearest unloading point of the new settlement. Details of numbers, mileage, costs, &c., are shown in a table.

After settlement, efforts were at first directed to increasing the size of the local food crops; afterwards other kinds were introduced and finally goats, sheep and cattle were brought in. The various problems, such as preserving the fertility of the soil, encouraging the production of clarified butter, hides and meat for export from the locality (since these are the only "cash crops" which can pay the cost of transport), are discussed.

These measures bring educational, medical and other facilities to the people and lead to better health and greater prosperity.

J. F. Corson.

i. LINHARD, J. Prises de sang journalières et rechutes sanguines dans la trypanosomiase. [**Daily Examination of the Blood in relation to Blood Relapses in Trypanosomiasis.**] *Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* Brazzaville. 1943, Jan., v. 2, No. 1, 3–10.

ii. ——. Valeur de la ponction sternale dans le diagnostic de a trypanosomiase. [**The Value of Sternal Puncture in the Diagnosis of Trypanosomiasis.**] *Ibid.* 11–15.

i. Thick blood-films of 73 sleeping sickness patients were examined daily for various periods in order to discover whether the presence of trypanosomes in the peripheral blood occurred in cycles. The number of examinations in different patients varied from 21 to 201. There were 39 patients in the first stage of the disease and 34 in the second stage. The results are given in a table which shows, for each patient, the number of blood examinations, the number of positive findings and the number of consecutive days in each relapse on which trypanosomes were present. [It is not clear whether the patients were having treatment by drugs during their periods of daily examination.]

The results varied greatly; in 12 patients (5 in stage one and 7 in stage two) no trypanosomes were found, but relapses occurred in all the others. Trypanosomes were usually present for not more than a few consecutive days at a time.

The author concludes that there is no cyclical reappearance of trypanosomes in the peripheral blood. The investigation showed that cases of sleeping sickness may be missed when only one blood-film is examined, as in routine surveys. [These patients were presumably infected with *Trypanosoma gambiense.*]

ii. Sternal puncture was performed on 40 sleeping sickness patients without local anaesthesia, a lumbar puncture needle being used. No patient complained of pain. Some received as many as 25 punctures. Examinations of thick blood films of these patients were made at the same time. Trypanosomes were found more frequently in the bone marrow than in the peripheral blood, the ratio being 211 : 129. They were found in the marrow and not in the blood in 101 examinations, but in only 19 examinations were they present in the blood and absent from the marrow. The results are shown in a table.

The author concludes that trypanosomes are more numerous and much more frequently found in the bone marrow than in the peripheral blood. [See also this *Bulletin*, 1938, v. 35, 704; 1939, v. 36, 216; 1941, v. 38, 304.]

J. F. Corson.

CHOUMARA, R. Un cas d'ascite à trypanosomes. [**Trypanosomes in Ascitic Fluid.**] *Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* Brazzaville. 1943, Jan., v. 2, No. 1, 16–17.

An African child, aged 6 years, showed scrotal swelling repeatedly between April 1941 and July 1942. Examinations made in the course of sleeping sickness inspections in March and October 1941 had not

given a diagnosis of sleeping sickness. In July 1942 the child's abdomen rapidly swelled and the scrotum was again swollen also. Six litres of ascitic fluid were removed by tapping and trypanosomes were found in it after centrifugation. Trypanosomes were also found in the blood and superficial lymph glands. The cerebrospinal fluid was normal. [See also this *Bulletin*, 1938, v. 35, 339.] *J. F. Corson.*

FULTON, J. D. & YORKE, W. **Studies in Chemotherapy. XXXIV. Comparison of the Results obtained by Different Methods of Administration of Drugs in Trypanosomal Infections of Mice.** *Ann. Trop. Med. & Parasit.* 1943, Sept. 7, v. 37, No. 2, 80–95. [21 refs.]

A comparison was made of the results of treatment of trypanosome infections, in large numbers of mice, with six drugs (tryparsamide, reduced tryparsamide thioglycollate, novarsenobillon, 4 : 4′-diamidino monomethyl stilbene, diamidino dimethyl stilbene, and 7-amino-9 (*p*-amino phenyl)-10-methyl phenanthridinium chloride) administered by oral, subcutaneous, intraperitoneal or intravenous routes. The maximum tolerated doses and the minimum curative doses varied according to the method of administration but the influence of this was not the same with each of the different compounds studied. In general, the highest amount was tolerated when given by the oral route and the least amount when given by the intravenous route. The best therapeutic indices were obtained by subcutaneous administration ; this was because the toxicity of the compound was lower when this route was used than when the intravenous or intraperitoneal methods were employed, but the therapeutic efficiency was not much diminished ; local necrosis was often caused at the site of injection. [This is a technical paper which is of much interest for those engaged on chemotherapeutic tests in mice ; but it cannot be adequately presented in an abstract.] *F. Hawking.*

TALIAFERRO, W. H. & OLSEN, Yelena P. **The Protective Action of Normal Sheep Serum against Infections of** *Trypanosoma duttoni* **in Mice.** *J. Infect. Dis.* 1943, May–June, v. 72, No. 3, 213–21. [Refs. in footnotes.]

"The protective property of normal sheep serum against the non-pathogenic *T. duttoni* of mice, which was first described by Thiroux, has been studied by comparing the time at which trypanosomes first appear in the blood of treated mice with untreated controls.

"This protective property exhibits the following characteristics : When titrated in a series of mice, it may exhibit complete protection in all doses above a minimal effective dose or may exhibit zones of inhibition, *i.e.*, alternate protection and partial or no protection. It is generally demonstrable in the serum of sheep over a year old in doses of 0·5 ml. or more per 20 gm. mouse and is sometimes demonstrable in doses as small as 0·1 ml. It is not diminished in titer after severe injury of the liver due to (1) pregnancy disease or (2) poisoning by carbon tetrachloride except in moribund sheep. It may be temporarily diminished to a slight degree after partial occlusion of the portal vein. It is absent or weak in titer in the fetus and the newborn lamb. It is demonstrable sporadically in a weak titer in lambs."

MAZZOTTI, L. & OSORIO, M. Teresa. Experimentos de transmision de *Trypanosoma cruzi* en cuatro especies de Ornithodoros. [**Experiments on the Transmission of *T. cruzi* by Four Species of Ornithodorus.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1943, June, v. 4, No. 2, 163–5. English summary.

"Experimental infection by *Trypanosoma cruzi* in specimens of *Ornithodoros furcosus, O. parkeri* and *O. amblus* was obtained. The infection persisted in each species at least during 429, 158 and 195 days respectively.

"It was not possible to obtain experimental infection of specimens of *Ornithodoros hermsi* on similar experimental conditions."

MAZZA, Salvador, with the collaboration of Germinal BASSO, Redento BASSO, Miguel E. JÖRG & Salomon MIYARA. Investigaciones sobre enfermedad de Chagas. Naturaleza histopatológica de reacciones alérgicas cutáneas provocadas en chagásicos con lisados de cultivos de *S. cruzi*. [**Histopathology of Allergic Cutaneous Reactions to Cultures of *Trypanosoma cruzi* in Chagas's Disease.**] *Universidad Buenos Aires: Misión de Estudios de Patologia Regional Argentina (Jujuy). Publicación No. 64.* 1943, 143 pp., 145 figs. [13 refs.]

In 1941 MAYER and PIFANO prepared "cruzin" from cultures of *T. cruzi* on NNN medium and noted its use in the rapid diagnosis of Chagas's disease [this *Bulletin*, 1941, v. 38, 640]. The authors of the monograph here reviewed have emulsified cultures of the trypanosome with ground glass in normal saline and after shaking it for six hours have filtered the product through cottonwool, paper and a Berkefeld V candle. This filtrate was then dialysed against distilled water. The result is a clear amber-coloured liquid which the authors designate "Lisado-filtrado-dialyzado A" or Lfd, and this they used for intradermo-reactions, injecting 0·1 cc. The immediate result is a papule with pseudopodia and in half an hour a surrounding erythema, the diameter of the whole being 1·5 cm., and in 24 hours 2 by 4 cm., then fading to the original size by the fifth day.

The authors have taken portions of the skin by biopsy for histological examination and describe their findings in minute detail and with abundant photomicrographic illustrations. They have similarly described the skin and glands in cases of Chagas's disease, presenting also temperature charts and photographs of patients showing Romaña's sign of palpebral oedema and dacryoadenitis, with accounts of the physical condition of fifteen patients. The progressive stages are described: the infiltration of the skin, invasion by leucocytes, degeneration of the cells of the *rete malpighii*, the perivascular infiltration, the nodules of histiocytes, inflammatory cytosteatonecrosis, the hyperplasia and keratosis of chagoma formation. All these are illustrated very clearly; the work is very full and detailed and the reproductions excellent. *H. Harold Scott.*

LEISHMANIASIS.

ANDERSON, T. F. **Kala Azar in the East African Forces.** *East African Med. J.* 1943, June, v. 20, No. 6, 172–5.

In this note the author gives a brief account of 136 cases of kala azar which have occurred in Africans in the Forces in East Africa. The majority of the cases, 87 in all, were infected near the mouth of the Omo river in the extreme south-western corner of Abyssinia, north of Lake Rudolf. Of the others 12 appear to have been infected at Archer's Post on the Uaso Nyiro River, while 19 were infected on the Nairobi-Addis-Ababa road in southern Abyssinia. The relatively large number of cases proves that kala azar is much more common in northern Kenya and southern Abyssinia than was previously supposed. In September 1941 Col. G. MACLEAN found ten cases of clinical kala azar amongst the indigenous native population on the lower Omo, and in three of these leishmania were demonstrated by spleen puncture. In the troops whose movements were accurately known, it was possible to calculate the mean incubation period as thirteen weeks. In the majority of cases infection occurred during the wet season—April to June. The fatality in the series was 32 per cent., but this high figure was largely due to a lack of the most satisfactory remedies.

C. M. Wenyon.

SEN GUPTA, P. C. **A Complement-Fixation Test for Kala-Azar.** *Indian Med. Gaz.* 1943, July, v. 78, No. 7, 336–9.

In 1939 LOWE and GREVAL [this *Bulletin*, 1940, v. 37, 43] in discussing the use of the WITEBSKY, KLINGENSTEIN and KUHN (W.K.K.) antigen for complement fixation tests for leprosy (which was first prepared as an aid to the diagnosis of tuberculosis), remarked that in South America BIER had obtained positive complement fixation reactions by its use in 70 per cent. of cases of muco-cutaneous leishmaniasis. LOWE and GREVAL reported that they had obtained positive results in all of 17 cases of Indian kala azar and in one of three cases of dermal leishmaniasis. GREVAL, LOWE and BOSE in the same year [this *Bulletin*, 1939, v. 36, 537] stated that with pooled sera from cases of kala azar they had obtained positive results with a serum dilution of 1 : 25, and a doubtful result with dilution of 1 : 50, while GREVAL, SEN GUPTA and NAPIER, with a slightly modified technique, found that the reaction was positive in all proved cases of kala azar with a dilution of 1 : 100, and that it was a diagnostic procedure of high order [this *Bulletin*, 1939, v. 36, 1030].

The author of the present paper has continued observations on the test and, employing the technique of Greval, Sen Gupta and Napier, has found that in tests carried out on 434 patients with various diseases, a positive result was obtained in 172 (97 per cent.) of 177 cases of diagnosed kala azar. The result was negative in all the other cases, except in one of chronic tuberculosis. The test is, however, also liable to be positive in severe leprosy, which cannot be confused with kala azar. It was positive in 21 of 22 cases of parasitologically diagnosed kala azar which were of such short duration that the aldehyde test was negative. One of these patients gave a history of one month's illness only. With treatment and recovery the reaction tends to

become negative. The conclusion is that the test is highly specific for kala azar, being negative in all disease conditions likely to be considered in the differential diagnosis. *C. M. Wenyon.*

BRAHMACHARI, P. N. **Post Kala-Azar Infection of the Skin by** *Leishmania donovani. Indian J. Med. Res.* 1942, Oct., v. 30, No. 4, 485–92, 13 figs. on 1 pl. [20 refs.]

The author discusses that peculiar cutaneous leishmaniasis which most usually follows recovery from kala azar, whether as a result of specific treatment or not.

The disease was named by its discoverer, UPENDRA NATH BRAHMACHARI, " dermal leishmanoid," and the present author devotes a considerable part of his paper to arguments for the retention of this name or the term " Brahmachari's disease."

He notes that the condition has been recorded only from India, but he suggests that careful search will probably reveal it in other localities where kala azar occurs.

The lesions of the skin which are found in this condition are erythematous patches, depigmented patches, papules and nodules. Leishmania are rarely found in the skin in the first two of these lesions. In the others they may be abundant. They are found in dermal melanophores, the large extravascular cells with small nuclei and a large amount of cytoplasm, the cells constituting the walls of the newly formed blood vessels in the granulation tissue, cells with branching processes in the deeper layers of the dermis, monocytes, neutrophils and giant cells. In his discussion of the possible reasons for this development of leishmania in the skin after their eradication from the internal organs as a result of treatment, the author visualizes " surviving parasites seeking shelter in the skin, after having been expelled from the viscera by the immune bodies." [This rather suggests that the leishmania are endowed with powers of intentional movement, though they are known to be quite non-motile. As a matter of fact it is quite unnecessary to suppose that after or during treatment leishmania invade the skin, for they are already present there, sometimes in large numbers. In some kala azar areas excision of portions of skin has been advocated for the purpose of making smears for the diagnosis of kala azar. Actually, it is admitted that some cases of " dermal leishmanoid " occur in persons who have recovered naturally from kala azar. It is only necessary to assume, therefore, that during the process of recovery from this disease changes may occur in the skin which favour the development of leishmania already there. It is quite unnecessary to assume that leishmania, like rats, can be driven from one hiding place to another.] *C. M. Wenyon.*

i. NAPIER, L. E. & SEN GUPTA, P. C. **The Treatment of Kala-Azar with Diamidino-Di-Phenoxy-Pentane. Preliminary Observations on the Treatment of 32 Cases.** *Indian Med. Gaz.* 1943, Apr., v. 78, No. 4, 177–83, 4 charts. [12 refs.]

ii. INDIAN MED. GAZ. 1943, Apr., v. 78, No. 4, 201–2. **Treatment of Kala-Azar : the Present Position.**

i. The authors commence their paper by stating that the drug is one of the aromatic diamidines synthesized by EWINS in 1939 and found by LOURIE and YORKE [this *Bulletin*, 1940, v. 37, 404, 405] to

have a curative action in *Trypanosoma rhodesiense* infection in rabbits and *Babesia canis* infection in puppies. It was successfully used in a small number of cases of visceral leishmaniasis in man by KIRK and MACDONALD [*ibid.*, 1941 v. 38, 261], KIRK and SATI [*ibid.*, 1941, v. 38, 573] and ADAMS [*ibid.*, 1942, v. 39, 172]. HUMPHREYS [*ibid.*, 1942, v. 39, 749] used it in two cases of oro-pharyngeal leishmaniasis, with successful results. It has been found to be satisfactory in the treatment of sleeping sickness by SAUNDERS [*ibid.*, 1942, v. 39, 532]. ADLER and TCHERNOMORETZ [*ibid.*, 1942, v. 39, 748] found that in Syrian hamsters infected with *Leishmania donovani* repeated injections of 3 to 5 mgm. per kgm. of body weight controlled light infections, but that for heavier infections 20 mgm. per kgm. of body weight was not as effective as 2 mgm. of diamidino-stilbene.

The authors now report the results of their treatment with the drug of 32 cases of kala azar in Calcutta. The ages of the patients varied from 1 to 40 years. They were classified into 2 groups—ordinary cases in which no treatment, or only inefficient treatment, had been carried out, and resistant cases which had failed to be cured by a full course of usually efficient antimonial treatment. In adults the dosage adopted was usually 0·025 gm. for the first injection, 0·05 gm. for the second, 0·075 gm. for the third, and then daily increases of about 15 to 20 mgm. till the maximum dose of 1 mgm. per pound of body weight was reached. The maximum dose was then continued to the end of the course. The injections were given intravenously in 1 per cent. solution in distilled water. If the resting systolic blood pressure was below 100 mm. of mercury, an injection of adrenaline (0·25 cc. of a 1 in 1,000 solution) was given hypodermically before the dose of the drug.

The results of the treatment were that of 21 ordinary cases 19 were cured, while of the 11 resistant cases 10 were cured. In one of the ordinary cases and in the one uncured resistant case death from complications occurred, while in the second uncured ordinary case the drug was entirely unsuccessful, treatment with neostibosan being substituted.

It is admitted that it is not yet possible to state how many of the cured cases are permanently cured—in fact one of the cured ordinary cases subsequently relapsed. As regards the immediate reactions to the injection of the drug, these were much less severe than those following the injection of diamidino-stilbene. The authors conclude that diamidino-diphenoxy-pentane has a well-marked anti-kala azar activity.

ii. In the same number of the *Gazette* in which the paper reviewed above is published will be found an Editorial initialled by the second author. In this is discussed the present position of the treatment of kala azar from the point of view of aromatic diamidines. It is noted that diamidino stilbene has the most powerful therapeutic action against kala azar, but unfortunately produces immediate reactions in the majority of cases, and troublesome neuropathic sequelae in some cases, which are unpleasant to the patient and sometimes alarming to the physician. Though these are entirely curable, and the immediate reactions avoidable, by the use of adrenaline, they preclude the use of the drug in an outpatient clinic. Again, though diamidino-diphenoxy pentane is more benign in its action, it is less effective as a curative agent. On the other hand, it has been found in India that the pentavalent antimony compounds cure about 95 per cent. of the cases, and are noted for their ease of administration and the

extreme rarity of unpleasant reactions. In the Sudan the antimonials appear to have been less successful. It is concluded that as far as India is concerned the large majority of cases will continue to be treated and cured with the antimonials, diamidino stilbene being reserved for the antimony-resistant cases which cannot otherwise be cured.

C. M. Wenyon.

ADAMS, A. R. D. **Studies in Chemotherapy. XXXV. A Case of Indian Kala-Azar treated with Propamidine (4 : 4′-Diamidino Diphenoxy Propane).** *Ann. Trop. Med. & Parasit.* 1943, Sept. 7, v. 37, No. 2, 96–7.

In previous papers ADAMS and YORKE and ADAMS [this *Bulletin*, 1940, v. 37, 775 ; 1941, v. 38, 260 ; 1942, v. 39, 172] have recorded the successful treatment of three cases of Indian kala azar, two with stilbamidine (4 : 4′-diamidino stilbene) and a third with pentamidine (4 : 4′-diamidino diphenoxy pentane). In the present paper the author describes the treatment of a fourth case of Indian kala azar in Liverpool with propamidine (4 : 4′-diamidino diphenoxy propane).

The case was typical of the disease, and treatment was carried out by the daily injection, for nine days, of 100 mgm. (roughly 2 mgm. per kilo. of body-weight) of the drug. After the injections there was a sharp rise of temperature to as much as 104°F. on the first four days of treatment ; thereafter the rise was less marked till it remained at 101°F., finally falling to normal two days after the last or ninth injection. The injections were not followed by any fall in blood pressure such as occurred after pentamidine.

In the present case when two successive injections were made into the same region of the deltoid a hard, painful lump formed. It did not suppurate, but was commencing to diminish in size only when the patient left hospital a month later. A single injection into the opposite deltoid produced a smaller swelling of only a week's duration. The remaining injections were given deeply into different regions of the buttocks and were not followed by any trouble. The patient left hospital, apparently cured, thirty-five days after the commencement of treatment.

C. M. Wenyon.

GOODWIN, L. G. & PAGE, J. E. **A Study of the Excretion of Organic Antimonials using a Polarographic Procedure.** *Biochem. J.* 1943, July, v. 37, No. 2, 198–209, 5 figs. [46 refs.]

By means of a rapid polarographic method the authors have studied the excretion of certain organic antimonials—tartar emetic, anthiomaline, stibophen (trivalent group) ; stibacetin, stibamine glucoside, neostibosan, urea stibamine and sodium antimony gluconate (quinquevalent group)—after injection into laboratory animals, and in the case of three of the compounds—stibophen, stibamine glucoside and sodium antimony gluconate—after injection into human beings. The results show that 30 to 40 per cent. of the antimony content of stibophen or one of the quinquevalent compounds is excreted by mice in the urine during the first 1 or 2 hours following the injection. The initial outflow is not so high in the case of tartar emetic and anthiomaline. After about 3 hours it was no longer possible to detect measurable amounts of antimony in the blood. The antimony excreted during the first 24 hours after injection of tri- or quinquevalent compounds

was of unchanged valency. After the injection of sodium antimony gluconate, part of the antimony remaining in the body was in the trivalent state, showing that reduction had occurred. Trivalent antimony was recovered from the livers of injected animals. It was demonstrated that quinquevalent antimony was reduced by living tissues in culture.

The observations recorded indicate that though a large proportion of the quinquevalent non-toxic compounds are rapidly excreted by the kidneys still in the quinquevalent state, some at least is retained in the body and is reduced to the trivalent state, and, though proof of this is difficult to obtain, it may be, as has generally been assumed, that the quinquevalent compounds are leishmanicidal only after reduction in the body. *C. M. Wenyon.*

[In Hackh's Chemical Dictionary the polarograph is defined as "an instrument which records the movements of a galvanometer by means of the image produced on a revolving drum of light-sensitive paper by a beam of light reflected from a mirror attached to the galvanometer needle. It records photographically minute changes in the intensity of a current that is due to applied voltage in electrolysis with a dropping mercury cathode."—*Ed.*]

DAVER, M. B. & AHMED, S. S. **The Occurrence of Oriental Sore in the Hyderabad State.** *Indian Med. Gaz.* 1943, June, v. 78, No. 6, 296–7.

During a nutrition survey of children in Pattan and Jalna in the Hyderabad State it was noted that many showed single and multiple sores or scars of healed sores on exposed parts of the body, and microscopical examination of a number of these showed that the condition was oriental sore, *Leishmania tropica* being found in aspirated material. The prevalence of the disease is shown by the fact that, of 1,262 boys and girls examined, 79 were affected. *C. M. Wenyon.*

FEVERS OF THE TYPHUS GROUP.

LEÓN, A. P. & APODACA, F. Aglutininas para los *Proteus* OX-19 y OX-K, en el suero de personas normales y enfermos de tifo exantematico de Mexico. Su valor diagnostico e importancia epidemiologica. [**The Agglutination of *Proteus OX19* and *OXK* in the Serum of Normal Persons and in Cases of the Typhus Fever of Mexico. The Importance of the Reaction in Diagnosis and Epidemiology.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1943, June, v. 4, No. 2, 95–126, 8 graphs & 1 fig. [20 refs.] English summary (8 lines).

The chief findings in this extensive investigation are briefly summarized in the following tables :—

Agglutination Reactions (percentage distribution)

Titres observed	*Proteus OX19*			*Proteus OXK*		
	Healthy persons (1,098)	Typhus patients 1st 10 days (173 cases)	Typhus patients Later (161)	Healthy persons (1,098)	Typhus patients 1st 10 days (173 cases)	Typhus patients Later (161)
Negative ...	27·1	18·8	1·2	46·7	30·5	19·9
1–20 to 1–80 ...	67·0	34·7	14·9	51·5	47·2	41·6
1–160 to 1–2,500	5·8 (*a*)	32·9	62·6	1·8 (*b*)	21·2	38·5
1–5, 120 and over... ...	0	11·9	21·1	0	1·5	0

(*a*) None over 1–320. (*b*) None over 1–160.

Average Titres at Different Stages of the Fever in Mexico					Average Titres in healthy persons	Standard Deviation
Days of disease	1 to 5	6 to 10	11 to 15	16 to 20		
Pr. OX19	1–53	1–2,343	1–2,254	1–2,236	1–27	1–48
Pr. OXK	1–135	1–197	1–107	1–211	1–21	1–36

The chief conclusions reached by the author as a result of a statistical examination of the findings are :—

(1) Titres of 1–320 and over are diagnostic in the case of *Pr. OX19* and of 1–200 and over in the case of *Pr. OXK*.

(2) Adopting these standards the observed agglutination reactions are classified as :—

(*a*) Diagnostic with *OX19* but not with *OXK* 39·9 per cent.
(*b*) Diagnostic with *OXK* but not with *OX19* 3·13 ,, ,,
(*c*) Diagnostic with both *OX19* and *OXK* 27·2 ,, ,,
(*d*) Not diagnostic with either organism ... 29·8 ,, ,,

(3) *Pr. OXK* as well as *OX19* should be used in the test.

(4) The sera of typhus patients contain pronounced, though variable, amounts of agglutinins for *Pr. OXK* so that there is no justification for regarding the normal reaction to this organism as being negative in typhus fever or for using the reaction to *OXK* as a basis for the classification of Rickettsiae.

(5) No statistically significant difference could be detected between the types of reactions observed in rural as compared with urban cases, nor between the types of reactions observed in three cases in which orchitic Rickettsiae were isolated as compared with ten cases in which the Rickettsiae were non-orchitic.

In 24 rabbits inoculated with a single orchitic strain there were 21 reactions to *OX19* in titres of 1–20 to 1–1,280, while all the reactions

to *OXK* were negative. In 18 rabbits inoculated with a single non-orchitic strain there were 14 positive reactions to *OX19* in titres of 1–20 to 1–320, and 9 to *OXK* in titres of 1–20 to 1–1,280.

The author's explanation of the great variations in the types of response to infection by the same Rickettsia is that the antigenic structure of the Rickettsia contains three elements—(*a*) the purely Rickettsial element which always predominates, (*b*) an element common to the Rickettsia and *Pr. OX19*, and (*c*) an element common to the Rickettsia and *OXK* ; the last named being the least important of the three elements. Different individuals and different animals respond in varying degree to the stimulus caused by each of these elements.

[The above abstract cannot claim to do justice to the statistical analysis to which the data have been subjected by the author. It should, however, be noted that the diagnostic significance of the reactions, especially those at low titres, cannot be stated in terms of arithmetical figures. FELIX has pointed out that, in countries where typhus is endemic, titres of 1–100 or even considerably higher cannot be regarded as having an absolute degree of diagnostic significance, whereas titres of 1–25 or 1–50, though not diagnostic in themselves, yet when observed after earlier negative responses are as diagnostic as higher titres. He stresses the importance of carrying out repeated tests, including low dilutions of 1–25 and 1–50 ; failure to do this often leads to missed or greatly delayed diagnosis, especially in very mild and very severe cases in which low-titre reactions are most likely to occur. The reaction, therefore, must not be regarded as an isolated circumstance ; its significance depends on earlier or later findings. The same principle will doubtless be found to apply to the Rickettsial-agglutination reactions if these should be found to be more strictly specific than the Proteus-agglutination tests.]

John W. D. Megaw.

EYER, H. & BRIX, W. Die orientierende Probeagglutination als diagnostischer Schnelltest. Die serologische Fleckfieberdiagnose unter Feldverhältnissen. [**A Rapid Agglutination Test for the Diagnosis of Typhus Fever in Field Conditions.**] *Deut. Militärarzt.* 1943, Apr., v. 8, No. 4, 193–4, 1 fig.

No claim is made for originality in the principle of this test, which is merely another of the many modifications of the rapid bedside test first introduced by BASS and WATKINS in 1910. These workers mixed a suspension of typhoid bacilli with a drop of haemolysed blood on a glass slide.

The authors use a strip of paper, known commercially as " structureless paper," instead of a glass slide. Near one end of this a drop of bacillary suspension [obviously of *Proteus OX19*, stained with methylene blue] is dried. When a prepared strip of this kind is available, all that is needed is to add a drop of tap water to the treated spot, stir with a glass rod, and then add a small drop of finger blood to the suspension thus obtained. The strip is tilted to and fro as in making a blood-grouping test. A strongly-positive reaction is shown by the prompt formation of small blue clumps which tend to congregate at the periphery of the drop. The fluid changes in colour from greyish-red to almost pure red. In weak positives the clumps are smaller, formed less rapidly, and the fluid becomes only reddish. When the

reaction is negative, no change is seen. A low-power lens is helpful in reading the reaction, which can still be seen after the drop has dried, so that the strips can be kept as records. [No mention is made of the keeping properties of the strips, presumably they can be used for about three months after being prepared.

STEUER [this *Bulletin*, 1943, v. 40, 898) has pointed out that dried suspensions of this kind are suitable for Proteus organisms and Flexner or Shiga dysentery bacilli, but not for the Widal test.]

John W. D. Megaw.

FIELDING, J. W. **Typhus: Modified Breinl Method for staining Rickettsiae and other Inclusions.** *Med. J. Australia.* 1943, May 15, v. 1, No. 20, 435–7. [11 refs.]

A modification of the method described by BREINL in 1911 for staining *Wuchereria bancrofti* has given excellent results for smears and sections containing "Rickettsiae and other inclusion bodies."

The method for fresh smears is—(1) Air-dried thin films are fixed for one minute in acetic-Zenker solution. (2) After thorough washing in water they are soaked for one minute in 1·0 per cent. solution of potassium iodide. (3) After thorough washing in water they are stained for two minutes in Löffler's methylene blue. (4) They are washed again and immersed for ½ to 2 minutes, with constant movement, in orange-tannin solution (3·0 gm. orange G in 150 cc. 70 per cent. alcohol, mixed with 350 cc. distilled water in which 50 gm. tannic acid have been dissolved). They are then washed and dried in air.

For smears that have faded after Giemsa, Castañeda, or Archibald staining, the procedure is as from step (2) after decolorizing with methyl alcohol.

Small pieces of tissue are fixed in acetic-Zenker solution, embedded in paraffin, sectioned, cleared in the usual way, stained in the same way as faded smears, passed with constant movement through graded alcohols to xylol, and mounted in neutral balsam.

A special technique is described for dealing with sections of ticks and other arthropods; this is rather complicated and the various procedures take about three weeks to complete. For details the original article must be consulted. *John W. D. Megaw.*

CLAVERO, G. & PÉREZ GALLARDO, F. Estudio experimental de una cepa apatógena e inmunizante de Rickettsia Prowazeki. Cepa E. [**Experimental Study of a Non-Pathogenic Immunizing Strain of *Rickettsia prowazeki*.**] Publicaciones de la *Revista de Sanidad e Higiene Publica.* Madrid. 1943, June, 29 pp. 17 figs. (8 folding). [12 refs.]

A strain of *R. prowazeki*, originally of high virulence, was maintained by egg-yolk transfers from September 1941 to the time of writing, May 1943; during this period 92 passages were made.

At the 2nd passage the strain was typically virulent for guineapigs, but at the 11th passage the Giroud intradermal reaction was found to have become weak, and at the 16th passage the strain had ceased to cause any febrile reaction in guineapigs. At the 24th passage its immunizing properties for guineapigs were found to be unimpaired.

By repeated tests from time to time the strain was found to be persistently non-virulent, though it fully maintained its immunizing

power. Similar results were obtained with two monkeys, *Macacus sylvanus*, at passage 71 and with two other monkeys at passage 79.

Detailed descriptions are given of the numerous experiments that were carried out. No cause could be discovered for the remarkable change in the strain, the passages were made in the usual way.

If further investigation should show that the strain is non-virulent and fully protective for man, and that it is incapable of being transmitted from man to man by lice, it may become a source of an effective and safe living vaccine against typhus fever in the same way as the 17 D strain of yellow fever virus has yielded millions of doses of protective vaccine.

The present report is to be regarded as a preliminary note on an investigation which is still in progress.

[Further developments will be awaited with keen interest all over the world.] *John W. D. Megaw.*

BENHAMOU, E., HORRENBERGER, R. & RENOUX, G. Transmission directe de *Rickettsia prowazeki* au poumon de souris à partir de la moelle sternale humaine. [**Direct Transmission of** *Rickettsia prowazeki* **contained in Human Bone Marrow to the Lung of the Mouse.**] *Arch. Inst. Pasteur d'Algérie.* 1943, June, v. 21, No. 2, 53–4.

Material obtained by sternal puncture from each of five typhus patients was suspended in small amounts of normal saline and introduced by the respiratory route to mice. In one case repeated passages through the lung were effected ; at the first inoculation there were only a few cell inclusions, but these became more numerous in successive passages, and at the 5th passage free Rickettsiae suddenly appeared in large numbers. From the 8th passage successful lung inoculations could be effected in rabbits. In another case lung passages in the mice ceased to occur after the fourth transfer. In the others no success was obtained, but the material was collected from patients with mild attacks.

In the successful cases the material was taken on the 8th and 11th days respectively, from patients who were seriously ill.

John W. D. Megaw.

YU, N. G. & YING, Y. Y. **Typhus Fever as seen in Kunming and Shanghai.** *Chinese Med. J.* Washington.* 1943, Jan.–Mar., v. 61, No. 1, 55–72.

An account is given of the clinical features of 112 cases of typhus fever in Kunming and of 22 in Shanghai. The disease in Shanghai was probably louse-borne, it was more severe than that in Kunming though there was only one death. It occurred in the cold season, November 1937 to May 1938.

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*Two issues of the *Chinese Medical Journal* bear the description Vol. 61, No. 1. The earlier, published from the Shanghai office of the Chinese Medical Association, is dated Jan.–Feb., 1942, while this, from Washington, D.C., U.S.A., is dated Jan.–Mar., 1943. The contents of the Shanghai and Washington editions are different.

There is also an issue of the *Chinese Medical Journal* bearing the description Vol. 61a, No. 1, published from Chengtu in Free China.

Infection in the Kunming cases was thought to be flea-borne; the attacks were distinctly mild, and no death occurred. Most of the cases (81) occurred in the four months August to November, the rest (31) were almost equally distributed over the other eight months of the year. The onset was insidious in nearly half of the Kunming cases; a rash was seen in 58 of the 112 patients; it was often generalized, extending to the palms and soles; petechiae were rarely seen. The leucocyte count was normal in about two-thirds of the cases; in the rest leucocytosis and leucopenia were equally common. The duration of the illness was 10 to 16 days in 79 of the 84 uncomplicated Kunming cases; it was 7 days in one, 8 days in one, and 17 days in three cases. In the same group of 84 cases the fever was continued in 24, remittent in 38, intermittent in 16, and low-grade in 6. The fever ended gradually in most of the cases; in one-third there was a rapid lysis; in a small number the fall was by crisis.

The Shanghai cases do not call for special comment.

John W. D. Megaw.

Bol. Oficina Sanitaria Panamericana. 1943, July, v. 22, No. 7, 590-91. English summary. Información sobre tifo exantemático en Bolivia. [**Typhus in Bolivia.**]

"Exanthematic typhus, formerly confused with typhoid fever in Bolivia, is an endemic disease which causes serious epidemics in the winter months. It is centred in the high Andean plateau which has a population of a million inhabitants, 90% of whom are 'aimara' and 'quechua' natives. The large city affected is La Paz, in direct contact as a trading, commerce, and supply centre with the Indian population of the highlands. The disease develops in the valleys only sporadically, although they are populated by the same kind of natives as those on the plateau. During the Chaco campaign, when thousands of plateau natives were fighting among the rest of the inhabitants, under lice-infested, unsanitary conditions, not a single outbreak of epidemic typhus occurred, although in the years 1933 and 1935 the plateau was suffering from a fierce epidemic which even spread to La Paz. It has been shown that 75 per cent. of the natives show positive reactions to the disease. However, during the last two years, cases of exanthematic typhus have been uncommon and it seems to have been replaced by recurrent fever which has appeared in the same areas and spread to some degree to the valleys. A possible deduction from these facts is that the virus (*Rickettsia prowazeki*) is of a special type, adapted to the Bolivian plateau and unable to flourish in a warmer climate, or that the lice in the valleys, for some unknown reason, do not transmit the disease."

Cimmino, V. Studio E. K. grafico sul danno miocardico nel dermotifo. [**Myocardial Damage in Typhus Fever studied by the Electrocardiograph.**] *Boll. d. Soc. Italiana di Med. e Igiene Trop.* (Sez. Eritrea.) 1943, v. 2, No. 4, 23–43. English summary (3 lines).

Details are given of the electrocardiographic findings in 100 cases of typhus [presumably louse-borne] in Asmara. In 82 of the cases a second examination was made on the 10th day after defervescence.

The conclusions reached were :—

	Febrile stage	Post-febrile
No lesions	0 per cent.	2·5 per cent.
Slight damage ...	46 ,,	40·2 ,,
Moderate damage ...	46 ,,	40·2 ,,
Severe damage ...	8 ,,	17·1 ,,

The chief findings were :—

	Febrile stage (100 cases)	Post-febrile (82 cases)
Sinus tachycardia ...	94	20
Sinus bradycardia ...	0	11
Auricular lesions ...	79	77 (changes in the P deflection)
Interference with the atrio - ventricular conduction ...	5	12 (P-R more than 20 seconds)
Abnormality in the S-T stage and T deflection... ...	36	31

These findings are regarded as being in keeping with what is known of the cardiac disturbances in typhus fever, including the frequent tendency to aggravation after the fall of the temperature.

John W. D. Megaw.

PINTO, M. R. Typhus endémique chez les rats de Lisbonne. [**Endemic Typhus in the Rats of Lisbon.**] *Arquivos Inst. Bact. Câmara Pestana.* 1942, v. 8, 197–9, 1 fig.

Cases of endemic typhus were diagnosed in the workpeople at a mill in Lisbon, and the author therefore undertook an investigation of rats in that city, and particularly of rats caught in the mill ; he examined 125. The brains of the rats were removed, pooled in batches of 2–5, emulsified in broth and injected intraperitoneally into guineapigs. Blood was also taken for the Weil-Felix reaction. From one batch of brains, removed from 5 *Rattus norvegicus* caught in the mill, a strain of Rickettsia (named Beato 1-Lisbon) was isolated ; this was consistently pathogenic for guineapigs, gave a scrotal reaction and fever, and extracellular Rickettsiae were present in smears from the tunica vaginalis. The infection in the guineapig protected against reinfection with the same strain, against a Moroccan strain of murine Rickettsia, and against a strain of Rickettsia from human sources in Madrid. It was pathogenic for rats.

The Weil-Felix reaction with *Proteus OX19* was positive in 34·9 per cent. of specimens from captured rats, in titres above 1 in 20.

Rabbits, after injection of this strain, showed agglutinins to *Proteus OX19* in titres up to 1 in 320 ; they had inapparent infections.

The epizootic occurred in the early winter months.

Charles Wilcocks.

PLOTZ, H., WOODWARD, T. E., PHILIP, C. B., BENNETT, B. L. & EVANS, K. L. **Endemic Typhus Fever in Jamaica, B.W.I.** *Amer. J. Pub. Health.* 1943, July, v. 33, No. 7, 812–14.

Endemic typhus fever is generally believed to be common in the West Indies though there are few reports of the occurrence of any form of typhus in the islands. This is the first report of endemic typhus in Jamaica. During five months in 1941–42, 68 probable cases were seen among natives living in rat-infested houses in Kingston. In 33 hospital patients the Weil-Felix reaction was positive, but a rash was seen in only 7 cases. The complement-fixation test to an endemic Rickettsial antigen was positive in all the cases. In a few cases there was also a positive reaction to epidemic antigen, but always at a lower titre. Unsuccessful attempts were made in a few cases to isolate the Rickettsiae. A suspension made from 13 fleas caught on rats from the homes of some of the patients caused a "sporadic" low fever in a guineapig, which later was found to be immune to endemic Rickettsiae. All the fleas were *Xenopsylla cheopis*. A similar result was obtained with a mixed suspension of fleas, lice, and mites, caught on the rats.

The findings are regarded as suggesting that the ectoparasites of the rats transmit the infection. *John W. D. Megaw.*

MAZZOTTI, L. & VARELA, G. Infección natural del gato con tifo, en México. [**Natural Infection of the Cat with Typhus, in Mexico.**] *Medicina.* Mexico. 1943, June, v. 23, No. 438, 229–30.

CIUCA, BALTEANU and CONSTANTINESCO [this *Bulletin*, 1935, v. 32, 565] infected domestic cats by feeding them with the organs of infected guineapigs. LÉPINE and LORANDO [this *Bulletin*, 1936, v. 33, 46] found cats naturally infected during an epidemic of typhus in Athens; infected fleas were found on the animals.

The present authors examined two cats belonging to a hospital in which were some typhus patients. The serum of the cats agglutinated *Proteus OX19* in dilutions of 1 : 80 and 1 : 40 respectively. Their brain tissues were injected intraperitoneally into rats, and six days later, the rat brain tissue was transmitted to guineapigs. This transmission from one of the cats produced fever and periorchitis in guineapigs, with abundant intra- and extracellular Rickettsiae in the tunica vaginalis.

The author concludes that the domestic cat may become naturally infected with typhus of murine type and play a part, as a temporary reservoir, in the epidemiology of the disease. *J. F. Corson.*

BRICEÑO-IRAGORRY, L. Formas clínicas del tifo exantemático en Venezuela. [**Clinical Forms of Typhus in Venezuela.**] *Bol. Oficina Sanitaria Panamericana.* 1943, May, v. 22, No. 5, 403–5.

"The first mention of exanthematic typhus in Venezuela was in March of 1896. Then in 1938, 1939, 1940, and 1941 studies of the disease were made by several doctors and cases were reported in various localities. The diagnoses in these cases were confirmed by the Weil-Felix reaction. The clinical forms of typhus in Venezuela may be reduced to two, the first being called Guacarapa fever, which to date has not been very well studied but is probably similar to Rocky Mountain spotted fever, and the second being known as benign, endemic, or rat-borne typhus. The rat-borne character of Venezuelan

typhus was demonstrated by the Weil-Felix reaction in the blood serum of patients as well as in rats of the Caracas area, and by experiments (as yet uncompleted) of isolation of the rickettsia in the brains of rats."

BAKER, C. G., ARCHER, G. T. L. & MITCHELL-HEGGS, G. B. **Endemic Typhus Fever in Diego Suarez, Madagascar.** *Brit. Med. J.* 1943, Oct. 23, 506–8.

The word endemic is used by the authors in its more legitimate sense to indicate the manner of occurrence of the disease. In North America the name endemic typhus is widely used as a synonym of flea-borne typhus, so that a misunderstanding is likely to arise.

The ten cases now described are of special interest because the French Public Health Report for 1940 stated that fevers of the typhus group did not occur in Madagascar.

No louse infestation could be detected in any of the patients, but all had been bitten by insects shortly before the onset. Rat fleas were possible vectors. The local dogs were tick-infested.

The onset was sudden in five, and gradual in five, cases. There was continuous high fever lasting 14 days; the symptoms as described were those of a fever of the typhus group of varying severity. A maculopapular rash was seen in six of the cases. It appeared first on the chest and flanks. In two cases it was restricted to the chest and limbs; in another it extended to the face; in the remaining three it was generalized. It first appeared on the 4th, 5th or 6th day in five cases, and on the 9th day in the sixth.

The Weil-Felix reaction was positive in rising titre in all the cases; it was of the *Proteus OX19* type except in two, in one of which the titre (1–800) was equally high for *OX2*, and in the other it was equally high for *OXK* (1–200). Except for the last-mentioned case the titre for *OX19* was 1–400 or over at some stage. High titres were rather late in appearing; in four cases tested on the 11th and 12th days the titres were 1–100, 1–100, 1–40, and 1–400, respectively. In five tested between the 14th and 19th days inclusive a titre of 1–800 was reached in one. In all the four cases tested between the 22nd and 27th days this titre was reached; it was still maintained in four of seven tested between the 35th and 47th days.

Animal experiments could not be carried out, so that no opinion is expressed with regard to the vector or animal reservoir.

There was evidence that the disease is endemic in Diego Suarez [on the coast] and probably elsewhere in Madagascar.

John W. D. Megaw.

TOPPING, N. H., HEILIG, R. & NAIDU, V. R. **A Note on the Rickettsioses in India.** *Pub. Health Rep.* Wash. 1943, Aug. 6, v. 58, No. 32, 1208–10.

Sera from three cases of sporadic typhus fever in India, seen recently by Heilig and Naidu at Mysore, were submitted to the complement-fixation test at the National Institute of Health, U.S.A. Bengtson's technique was employed. All the sera reacted more strongly to antigen of the Rocky Mountain spotted fever type than to antigens of epidemic or endemic typhus types. The causal agent was, therefore, regarded as being most closely related to the Rickettsiae of the first-named disease.

The highest titres observed, apart from " trace " reactions, were :—

	Rocky-Mountain-fever antigen	Epidemic-typhus antigen	Endemic-typhus antigen
1	++++1–32 and +1–128	+1–4	++1–4 and ±1–8
2	++++1–256 and ++1–512	+1–4	++++1–4 and ±1–25
3	++++1–256 and ±1–512	++++1–4 and +1–16	++++1–4 and ±1–64

Cross-fixation at lower dilutions with endemic-typhus antigens has also been observed in some cases of Rocky Mountain fever, but is not common.

[These findings are of great interest ; they should be read in conjunction with two previous papers by Heilig and Naidu (see this *Bulletin*, 1942, v. 39, 375 and 827). In the first of these papers four cases were described and the diagnosis of " endemic tropical typhus " was made ; in the second paper ten more cases were reported and the opinion expressed was that they resembled Boyd's X2 group, clinically related to Indian tick typhus. In the opening sentence of the present paper reference is made to an article by the reviewer in 1921 in which a tick was implicated as the vector in a case of typhus-like fever in India. In that article the view was expressed that the fever was identical with, or closely related to, Rocky Mountain spotted fever, and that it might be found to be widely distributed in India and elsewhere in the world. It is to be hoped that workers in India and other countries will be able to carry out complement-fixation and Rickettsia-agglutination tests with a view to differentiating between cases of the various fevers of the typhus group. Neither guineapig inoculation nor the Weil-Felix reaction has proved satisfactory in this respect.]

John W. D. Megaw.

READING, B. & KLINT, H. **Clinical Observations on Spotted Fever in the Gulf Coast Area of Texas.** *Amer. J. Trop. Med.* 1943, July, v. 23, No. 4, 445–9, 4 figs.

Brief clinical accounts are given of four fatal cases of " spotted fever " in children whose ages ranged from ten months to seven years.

The authors' suspicion that *Amblyomma americanum* may be a vector of the disease is rather belated owing to the seven months' delay in the publication of the paper. R. R. PARKER and his colleagues have shown that this tick is a vector, and they have also referred to two of the present cases [this *Bulletin*, 1943, v. 40, 835]. Another suggestion is that some of the cases of endemic typhus which are being reported in increasing numbers in the Gulf-Coast area of Texas may really be spotted fever.

The rash in all four cases appeared within one or two days of the onset ; in three cases it was seen first on the extremities, and then extended all over the body, including the palms and soles. It rapidly became petechial or extensively haemorrhagic. In two cases *Proteus OX19* was agglutinated 1 : 320 ; in the others the reaction was negative, but the patients died on the 9th and 10th days. The leucocyte count in one case ranged from 3,900 to 15,000 ; in another from 2,800 to 4,800 per cmm. No reference is made to the counts in the other cases.

Tick infestation is mentioned in three cases. In one of these a specimen of *Dermacentor variabilis* was found on the body. The Rickettsia isolated from one patient was found by ANIGSTEIN and BADER [this *Bulletin*, 1943, v. 40, 386] to give cross immunity with *R. ricksetti.* *John W. D. Megaw.*

MAGALHÃES, O. Tifo exantemático neotrópico (no Brasil). Propriedades neurotrópicas do virus. [**Neotropical Exanthematic Typhus (in Brazil). The Neurotropic Properties of the Virus.**] *Brasil-Medico.* 1943. Mar. 20–27, v. 57, Nos. 12–13, 103–7, 7 figs. & 4 charts.

This paper deals specially with the pronounced neurotropic properties of the virus of tick-borne typhus of the Brazilian type. No mention is made of the arthropod vector, and anyone who read the paper without knowing that it referred to tick-borne typhus would be quite likely to regard it as a description of the nervous symptoms of louse-borne typhus. Although no reference is made to the striking similarity in the neurological features of the two diseases; this is so obvious from the author's description and from the photographs that a detailed summary of the article is unnecessary.

[The author has made a large number of interesting contributions to the literature of tick-borne typhus as seen in Brazil. In a paper in English he used three different names to designate the disease; now he has adopted yet another name as being more suitable. The word exanthematic forms a part of all the four names and adds to the confusion that must exist in the minds of uninitiated readers. The Brazilian disease differs in no essential respect from the tick-borne typhus-like fever known as Rocky Mountain spotted fever; this again has so many points of resemblance to the other tick-borne fevers of the typhus group, except perhaps Q fever, that the desirability of adopting a uniform group name is obvious. Till a better name is proposed my long-standing suggestion of tick typhus seems to be suitable; this can be followed by a subtitle to indicate the variety of the disease that is referred to.] *John W. D. Megaw.*

MAGALHÃES, O. & ROCHA, A. Sensibilidade dos morcegos ao virus do tifo exantematico neotropico, no Brasil. [**Susceptibility of Bats to the Virus of Neotropical Exanthematic Typhus (Tick-borne).**] *Brasil-Medico.* 1943, May 1–8–15, v. 57, Nos. 18–19–20, 207–10.

ARAGÃO in 1936 showed that bats might harbour the tick *Amblyomma cajennense.* This observation suggested to the author that bats might possibly be reservoirs of infection of Rickettsiae, which might therefore be conveyed to distant places and transmitted to human beings by the ticks. Dogs or cats, which devour the bats, might serve as agents for the transport of the ticks or as intermediate reservoirs of infection.

One strain of the Rickettsia was found to be pathogenic to the bats *Histiotus velatus* and *Hemiderma perspicillatum,* causing typical lesions. Infection was transmitted from the infected bats by inoculation of brain suspensions into guineapigs.

A vampire bat, *Desmodus rotundus rotundus,* was not found susceptible to this strain of the Rickettsia. Two other strains of the Rickettsia gave negative results with all three species of bats.

The method of testing was intraperitoneal inoculation of the bats with suspensions of brains of infected guineapigs.

An emulsion of the salivary glands of one of the inoculated vampire bats was injected intraperitoneally into a guineapig, which developed splenomegaly, but attempts at passage of the infection failed.

John W. D. Megaw.

DAVIS, G. E. **The Tick *Ornithodoros rudis* as a Host to the Rickettsiae of the Spotted Fevers of Colombia, Brazil, and the United States.** *Pub. Health Rep.* Wash. 1943, July 2, v. 58, No. 27, 1016–20.

Specimens of *Ornithodorus rudis* experimentally infected with the spotted fever of Colombia were used to establish infection in guineapigs.

Some of the original ticks, and the progeny of one of them, were employed in 16 attempts to transmit infection from guineapig to guineapig by biting. From 6 to 75 ticks were used in each test, but without success. All but three of these lots of ticks were found to harbour infection in their tissues ; this was demonstrated by inoculating guineapigs with suspensions of the ground-up ticks.

Similar results were obtained when tests of the same kind were made with two lots of ticks infected with Brazilian spotted fever, and with two lots infected with Rocky Mountain spotted fever.

In one of the experiments on the Colombian strain the progeny of infected ticks were found to harbour infection ; this was an unexpected finding because the progeny of ticks which are unable to transmit infection by biting are not usually infected.

O. rudis was found to harbour the infection of Colombian fever for 343 days, it harboured infection of Brazilian fever for 191 days, and of Rocky Mountain fever for 243 days, though it was not capable of transmitting infection by biting in any case. *John W. D. Megaw.*

DAVIS, G. E. **Experimental Transmission of the Spotted Fevers of the United States, Colombia, and Brazil by the Argasid Tick *Ornithodoros parkeri*.** *Pub. Health Rep.* Wash. 1943, Aug. 6, v. 58, No. 32, 1201–8, 3 figs.

By a series of experiments in which large numbers of guineapigs were used it has been shown that the tick *Ornithodoruspar keri* can transmit, by feeding, the causal agent of the spotted fevers of the U.S.A., Colombia, and Brazil.

The progeny of infected ticks transmitted infection by feeding, even in some cases in which the mother tick had failed to do so.

In the case of the U.S.A. fever the progeny of infected ticks were infective to the fourth generation ; in the case of the Colombian fever they were infective to the second generation, and in the Brazilian fever to the first generation.

Transmission was effected by larvae, throughout the nymphal stages, and by males and females. One female was infective 994 days after the infective feeding in the second nymphal stage. The interval between the original infective feeding and the transmission of infection by the progeny of the fourth generation was 1,333 days in one case. The virulence of the infection was fully maintained over this period, typical fever being caused in 12 guineapigs, of which seven showed scrotal oedema.

Ticks that had fasted for one year, and their progeny, were found to be still infective.

O. parkeri may therefore play a part in maintaining the infection in natural conditions and may, occasionally, be a vector to man.

John W. D. Megaw.

DENGUE.

FINDLAY, G. M. & BROOKFIELD, R. W. **A Fever of the Dengue Group occurring in West Africa.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1943, Sept., v. 37, No. 2, 95–109, 6 charts. [17 refs.]

Short fevers resembling dengue have been reported from time to time in West Africa, especially in the coastal area. In 1870 GORE referred to epidemics of dengue in Sierra Leone; reports since 1913 refer only to small outbreaks or sporadic cases of short fevers which were seldom regarded as being dengue.

The present observations deal with small outbreaks and sporadic cases of a short dengue-like fever occurring in Europeans and Africans in various localities in Nigeria and the Gold Coast.

The fever lasted from 2 to 10 days and often was of the saddle-back type. There were vague pains referred to the muscles, bones, and joints, enlargement of the lymph nodes, and a measles-like rash coming out from the second to the sixth day. Mice, guineapigs, rabbits, bush-rats, and various monkeys were not susceptible to inoculation with the blood of patients. The disease was transmitted to two human volunteers by subcutaneous injection of 1·0 cc. of serum taken from a patient on the second day of the fever. Blood taken from one of these volunteers on the third day of the fever, and injected into a third volunteer, caused only fleeting rises of temperature to 99°F. and 99·8°F. on the fifth and sixth days after inoculation.

Two African volunteers in Nigeria were inoculated with blood taken on the fifth day of a patient's illness, and two others with blood taken on the third day; there was no response in any case.

All blood cultures and serum-agglutination tests were negative. Mice inoculated with the serum of convalescents were not protected against infection with the viruses of Rift Valley fever, Bwamba forest fever, and West Nile fever. Mixtures of the viruses of these fevers and convalescent serum kept for two hours at 37°C. retained their infectivity for mice.

The total leucocyte count varied from 4,400 to 8,000 [the days of the disease are not stated] there was a relative increase in the lymphocytes on the fourth day.

Attacks in Europeans were rather more severe than those in Africans; the backache was more pronounced and the rash appeared later in the former.

The disease resembled dengue in most of the clinical symptoms and in all the experimental findings, but it was regarded as differing in the absence of break-bone pains and in the occurrence of enlargement of the lymph nodes. It closely resembled the *fièvre rouge* of the Belgian Congo.

[This report is of special importance because of the thorough manner in which the cases were investigated. Although the authors refer to certain points in which the disease was regarded as differing from classical or "true" dengue, they have wisely refrained from suggesting

that these differences justify a claim to the isolation of a new disease. They only go so far as to suggest that a number of different diseases may have been called dengue. This is probably true, but it is also true that in many outbreaks of classical dengue enlargement of the lymph nodes and absence of break-bone pains have been noted, so that there are grounds for making an alternative suggestion that there are several varieties of dengue which differ from each other because of variations in the strain of the virus, the susceptibility of the affected communities, and the conditions in which transmission occurs. Similar variations occur in the related virus disease, yellow fever. There need be no quarrel with the authors' decision to call the disease a dengue-like fever; if other observers would follow their example we should be spared the infliction of a flood of "new" diseases with unsuitable names.] *John W. D. Megaw.*

WOODLAND, J. C., MCDOWELL, M. M. & RICHARDS, J. T. **Bullis Fever (Lone Star Fever—Tick Fever). An Endemic Disease observed at Brooke General Hospital, Fort Sam Houston, Texas.** *J. Amer. Med. Ass.* 1943, Aug. 21, v. 122, No. 17, 1156–60, 1 chart.

The authors give a full and clear account of a fever which, in their opinion, is "a new disease entity heretofore undescribed."

They saw 33 cases during the spring and summer of 1942 among soldiers engaged in field exercises at Camp Bullis, near Houston, Texas. All the patients had multiple tick bites by *Amblyomma americanum* shortly before the onset. The fever lasted 3 to 7 days in 27 cases; 8 days in 2; 9 days in 2; 11 and 13 days, respectively, in the remaining two.

The onset was abrupt; most of the patients had post-orbital or occipital headache, the fall was by lysis, there was no further rise in temperature except in a few instances in which an occasional rise to 99°F. was observed. Convalescence was protracted, especially in severe cases. All the patients had enlargement of at least one set of lymphatic glands, general adenopathy was common. The throat was slightly red and injected.

In the more severe attacks (10 per cent.) a maculo-papular rash was seen on the trunk early in the course of the fever; in some cases this was like the rash of endemic typhus, in others like that of German measles; it never lasted more than 48 hours.

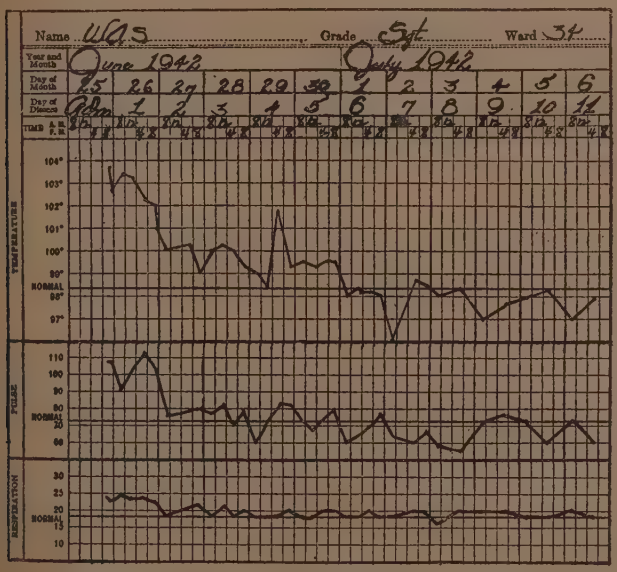
There was pronounced leucopenia on the second or third day; the total count fell to 3,000 in many cases; in one case it was 1,750. There was an associated neutropenia. The blood of six patients was tested at the National Institute Laboratory; completely negative findings were reported for fevers of the typhus group, undulant fever, tularaemia, typhoid, and paratyphoid A and B.

Inoculation tests on guineapigs, rabbits, and chick embryos, were carried out at the Command Laboratory but no causal agent was disclosed. Several of the guineapigs had a mild transient fever on the ninth day after intracerebral inoculation with cerebrospinal fluid; others had similar fever on the 9th or 10th day after intraperitoneal inoculation with blood. One guineapig inoculated intracerebrally with pooled suspension of 150 ticks collected at the camp had a temperature of 106°F. on the ninth day. K. F. Maxcy, N. H. Topping, and J. C. Snyder, visited the hospital and saw some of the patients;

they are stated to have tentatively suggested the name tick-bite fever, and to have expressed the opinion that the evidence was highly suggestive of a tick-borne infection. [The name tick-bite fever has already been earmarked for tick-borne typhus in South Africa.]

The authors exclude Colorado tick fever [see this *Bulletin*, 1941, v. 38, 694] by the absence of a saddle-back type of fever and by the occurrence of lymphatic enlargement. They exclude dengue by the absence of exposure to mosquitoes and by the clinical course of the disease. They state that 485 further cases have been seen in May and June 1943, and that one of these patients died of agranulocytic anaemia with sepsis.

[Although classical mosquito-borne dengue can be excluded on epidemiological grounds the clinical features of Bullis fever do not seem to differ in any essential respect from those of dengue, or for that matter from those of Colorado tick fever. Variations in such features as lymphatic enlargement and the occurrence of a two-phase type of fever are observed in different outbreaks of dengue, and there is no reason why they should not also occur in the clinically similar diseases in Colorado and Texas. It will be seen from the chart, which is the only one reproduced in the article, and which is stated to be from a typical case, that it shows two-phase type of fever curve; this chart



Temperature, pulse and respiration charts in a typical case of Bullis fever observed at the Brooke General Hospital, Fort Sam Houston, Texas.
[Reproduced from the *Journal of the American Medical Association.*

and the reference to occasional secondary rises suggests a tendency to the occurrence of the single relapse so often seen in dengue, and occasionally also seen in the related disease, sandfly fever. The descriptions of Bullis fever and Colorado tick fever tempt the reviewer to speculate

on the possibility that both diseases may turn out to be primarily a zootic fever transmitted by a tick and belonging to the dengue group. If this guess should be correct the name tick dengue would deserve serious consideration in preference to a place name which is certain to be misleading. No tick-borne fever is likely to be the monopoly of one locality.] *John W. D. Megaw.*

PLAGUE.

PUBLIC HEALTH REP. Wash. 1943, Apr. 16, v. 58, No. 16, 640–45. **Plague Infection reported in the United States during 1942 in Human Beings.**

One case of human plague was reported in the United States in 1942. The patient was a child living in California. Plague infection was reported in rats, wild rodents, or their ectoparasites in six western States—California, Idaho, Montana, Nevada, Oregon and Washington—and details are given on the 150 instances in which investigation produced positive results. The animals found infected, or from which infected ectoparasites were obtained, were the ground squirrel, jack rabbit, marmot, chipmunk, mouse, pack rat, cottontail rabbit, brush rabbit, gopher, and badger. The infected ectoparasites included fleas, lice and ticks.

The reports are not claimed to give a complete picture of the infection of field rodents, but they demonstrate the continuance of a wide distribution of plague infection in western United States.

Charles Wilcocks.

GIRARD, G. Sensibilité des bacilles pesteux et pseudotuberculeux d'une part des germes du groupe coli dysentérique d'autre part aux bactériophages homologues. [**Sensitiveness of Plague and Pseudotuberculosis Bacilli to Bacteriophages of the Coli-Dysentery Group.**] *Ann. Inst. Pasteur.* 1943, Jan.–Feb., v. 69, No. 1–2, 52–4.

Girard, with other French authors, has not subscribed to the identification of plague and pseudotuberculosis bacilli with the Pasteurella group of organisms [this *Bulletin*, 1943, v. 40, 139]. In the present communication, as a result of experiments with phages on strains of plague and dysentery, he suggests that we are dealing with " a single phage active on the two species plague and dysentery, or with two phages having reciprocal activity on these same organisms." That, however, does not justify any contention that the organisms of plague and dysentery have antigenic characters in common; indeed the reverse seems to be the case, as judged by serological and immunity tests. Meanwhile this phenomenon remains without a solution, nor does it mean that phage is any less valuable for the identification of the plague bacillus, because it has been deprived of some of its specificity. In the discussion which followed BLANC agreed with Girard that the plague bacillus ought not to be placed in the group of Pasteurella, not only because the lytic principle of the plague bacillus is not transmissible to the Pasteurellas, but also because a Pasteurella, instead of multiplying in the rat-flea, *X. cheopis*, is destroyed in less than 24 hours. *W. F. Harvey.*

PRINCE, F. M. **Report on the Fleas** *Opisocrostis bruneri* (**Baker**) **and** *Thrassis bacchi* (**Roths.**) **as Vectors of Plague.** *Pub. Health Rep.* Wash. 1943, July 2, v. 58, No. 27, 1013–16, 1 fig.

The Public Health Authorities of America are distinctly concerned over the possibility of spread of sylvatic plague from the Western States, in which it is now present, to the Eastern States which are still free. Examination into this problem takes one of two lines—that of the suitability of the host animal and that of the vector flea. In 1941 " plague was found in each of four lots of fleas collected from Richardson's ground squirrels (*Citellus richardsoni richardsoni* (Sabine)) of Divide Country N. Dak." It was the first finding of plague in the Plains States. The fleas collected from these squirrels were *Opisocrostis tuberculatus tuberculatus*, *O. labis*, *Oropsylla rupestris* and *Thrassis bacchi*. The first three species had been previously proven to be possible plague vectors and the last is now examined by the author along with *Opisocrostis bruneri*. Large numbers of these two fleas have been collected from Richardson's, Franklin's and 13-striped ground squirrels. Guineapigs were the test animals and control experiments were duly set up. Both the fleas proved to be vectors of plague after feeding on guineapigs with plague bacteraemia. When the results are compared with those obtained with the rat flea *Xenopsylla cheopis* and with *Diamanus montanus*, the flea of the Californian ground squirrel, which are highly efficient vectors, it became evident that " *O. bruneri* and *T. bacchi* may be regarded as equally capable vectors." The final conclusion reached is that: " A continuous chain of fleas capable of the transmission of plague and of hosts which have been found infected or of others which are very probably susceptible to infection extends from the Rocky Mountain States and Western North Dakota, in which plague prevails, to the States east of the Mississippi River." *W. F. Harvey.*

JACHOWSKI, L., Jr. **The Oriental Rat Flea** (*Xenopsylla cheopsis*) **in Michigan.** [Research Notes.] *J. Parasitology.* 1943, Aug., v. 29, No. 4, 300.

The first record of the finding of this flea on a rat in Michigan.

BOMBAY: REPORT OF THE HAFFKINE INSTITUTE FOR YEARS 1940 AND 1941, 37–45. **Antiplague Serum, Sulphathiazole and Sulphapyridine in the Treatment of Bubonic Plague** [SOKHEY, S. S. & WAGLE, P. M.].

In the field trials on which this study of plague treatment is based it was found that the most important single factor deciding the issue was the development and degree of septicaemia. If no septicaemia occurred spontaneous recovery usually took place but the contrary was the case if septicaemia did occur. The grade of septicaemia was called mild or severe according as 0·25 cc. of blood gave less or more than 10 colonies on culture. Control of dosage to maintain the blood concentration of the drug used was effected by making estimations every 4, 6, 8 and 24 hours after the first dose and then once daily. Some observations are made on the selection of cases. No selection was practised: patients were taken in strict succession for one of the forms of treatment, but as some cases were excluded from the survey of results because of death within 12 or 24 hours of admission, totals are not all equal. Other cases left hospital against advice while still

febrile. The pneumonic plague cases, only 10 in number, are dealt with separately. As septicaemia seldom developed after treatment had once started the truest picture of results would be obtained if "only those cases are considered which had septicaemia at the time the treatment was started." These field trials apply to the testing of "the comparative curative value of Haffkine Institute antiplague serum, sulphathiazole, sulphapyridine and sulphathiazole cum antiplague serum." Various doses were given but that which came to be adopted was: (1) Sulphathiazole, 10 gm. the first day and 7·5 gm. per day for some four to five days and a small dose later, giving a concentration of 5–10 mgm. per cent.; (2) Sulphapyridine, 8 gm. the first day and 3–4 gm. per day during the next four days, giving also a concentration of 5–10 mgm per cent. The case mortality in all field trials with treatment by antiplague serum, sulphapyridine, sulphathiazole, sulphathiazole cum antiplague serum and iodine intravenously (controls) was 23·5, 27·0, 20·8, 20·0 and 53·6 per cent. respectively. The same figures for cases with plague septicaemia at the time of commencement of treatment were 69·0, 72·2, 55·4, 38·1 and 96·4. Treatment did not save any of the pneumonic cases.

W. F. Harvey.

INDIAN RESEARCH FUND ASSOCIATION. REP. SCIENT. ADVISORY BOARD FOR YEAR 1ST JAN. TO 31ST DEC., 1942, 54–9. **Plague Researches under the Director, Haffkine Institute, Bombay.**

Treatment of plague with sulphonamide-group substances is under trial. A small number of cases have been treated (1) with sulphathiazole, (2) sulphathiazole plus antiplague serum, and the results are compared with each other and a no-treatment control. The efficacy of sulphathiazole seems to be evident and an increase of that efficacy when antiserum is added is at least suggested by the figures. Clinically, "a marked advantage was noticed in favour of the combined treatment."

Another research of high importance has proclaimed a definitely greater protective power of living avirulent immunogenic vaccine over killed vaccine. That view has been held now for some time by OTTEN for his Tjiwidej smooth strain and by GIRARD and ROBIC for their E. V. strain. A great advance will have been made when, as is here asserted, it is proved possible to obtain a plague strain at will with the combined properties of avirulence and immunogenic power. The two do not necessarily go together. In fact continued subculture may result in complete loss of the immunogenic power. The comparative measurements of the 25th subculture of strain 53H show it to be much more immunogenic than Tjiwidej Smooth or E.V. strains. Its mouse protective dose requires only 875 organisms as compared with 800,000 for both the other strains. When comparison is made of the living 53/H/25 strain with killed vaccine (heat at 54°C.) the same difference is apparent. The mouse-protective dose is 0·001 cc. for the living strain and 0·0065 cc. for the heat-killed vaccine.

Another investigation has been directed to the relative values of agar and broth vaccines. The advantage which originally lay with the agar vaccine only because it could be more rapidly prepared has now been lost, for it is now "possible to produce as good a broth vaccine with a three-day growth as an agar vaccine" and "broth vaccine is

obviously easier to make." The three-day growth broth vaccine also gets over a former objection to its use—its toxicity.

W. F. Harvey.

MACCHIAVELLO, A. Sobre a peste no Nordeste Brasileiro. (Resposta ao Sr. Marcello Silva Junior.) [**Plague in North-Eastern Brazil (Reply to Marcello Silva, Junior).**] *Brasil-Medico.* 1943, Jan. 2–9, 16–23–30 & Feb. 6–13, v. 57, Nos. 1–2, 3–4–5 & 6–7, pp. 6–9; 31–4; 46–9. [13 refs.]

JUNIOR, M. da S. Sobre la peste en el Nordeste Brasileño. (Treplica ao Sr. Macchiavello.) [**Plague in North-Eastern Brazil (Reply to Macchiavello).**] *Brasil-Medico.* 1943, Feb. 20–27, Mar. 6–13, Apr. 3–10, 17–24, May 1–8–15, 22–29, June 5–12 & 19–26, v. 57, Nos. 8–9, 10–11, 14–15, 16–17, 18–19–20, 21–22, 23–24 & 25–26, pp. 70–74; 89–92; 182–4; 193–5; 214–15; 235–7; 254–6; 275–9, 6 figs.

CHOLERA.

INDIAN RESEARCH FUND ASSOCIATION. REP. SCIENT. ADVISORY BOARD FOR YEAR 1ST JAN. TO 31ST DEC., 1942, 1–4. **Cholera Treatment Enquiry under the Director, School of Tropical Medicine, Calcutta.**

This is a very condensed technical report of research work, which merits abstraction from the full publications themselves. Experimentation with abundant animal and *in vitro* control shows the value of treatment of cholera with sulphaguanidine. The dosage was 5 gm. on admission and 2·5 gm. every four hours until 20 gm. in all had been given. Green dyes of the type of brilliant green and malachite green are also effective against cholera vibrios both *in vitro* and *in vivo*. "Vibrios usually disappear from the stool in 2–3 days on administration of 1/2500 dilution of brilliant green." Other researches were directed to the preparation of pyrogen-free distilled water for intravenous injections and to the isolation of vibrios from cholera stools and Hooghly water by the "candle-boric-peptone-water method, by direct plating on the bile-salt agar and Wilson and Blair's solid media respectively." Interesting notes are included of bacteriological studies of *V. cholerae* and non-agglutinating vibrios, which refer especially to: (1) the purity of type obtained by single colony isolation, (2) survival of vibrios in river water, (3) invasiveness and toxicity, (4) skin reactions obtained with non-specific bacteria in cholera cases, and (5) the common antigenic structure of the non-agglutinating vibrios isolated at the beginning of the disease, with some divergence of structure in the later stages. Some miscellaneous studies complete the report.

W. F. Harvey.

INDIAN RESEARCH FUND ASSOCIATION. REP. SCIENT. ADVISORY BOARD FOR YEAR 1ST JAN. TO 31ST DEC., 1942, 4–8. **Enquiry to determine the Endemic Foci of Cholera in certain parts of Bengal and Madras Presidencies under Dr. K. C. K. E. Raja, Offg. Deputy Public Health Commissioner with the Government of India.**

Cholera endemicity had been established previously for the districts of Tanjore, Trichinopoly and South Arcot. As the figures published

for these and other districts related to the period 1896–1925, they provide a safe basis for comparison of the incidence of cholera in later years. The first comparison made is of the incidence of cholera, based on monthly cholera mortality figures, for 1896–1925 and 1927–1941 respectively. The district Tanjore may be taken as representative of an endemic area ; it showed only 3·1 per cent. of months free from cholera in the first of the two periods and 15·6 per cent. in the second. The next table deals with total cholera deaths in five 6-yearly intervals from 1912 to 1941. If the results for Tanjore are expressed in percentages of the total deaths (107,402) for the entire period we find these to be 29·2, 17·6, 34·4, 9·5 and 9·3 respectively. There was a rise for the 6-yearly period 1924–29 " but, broadly speaking, the mortality from cholera seems to have decreased from 1930 to 1941." The subject of lowered incidence merited further study by the investigation of the state of affairs in smaller areas, and the " taluk " was the smallest unit available for the purpose. The author contends that for the study of cholera endemicity " the area under investigation should be homogeneous with respect to its cholera history. What is meant is that the component parts of the area should not show marked variations in the incidence of the disease either from year to year or from season to season within each year." There are 26 taluks in the three districts of Tanjore, Trichinopoly and South Arcot. Study of cholera figures by statistical analysis has shown that one area of 11 contiguous taluks (six in Tanjore, three in Trichinopoly and two in South Arcot) . . . forms a homogeneous cholera district. " The remaining fifteen taluks differ from one another to such an extent that any two of them cannot be combined." Investigation of endemicity is to be made by comparison of the 11 homogeneous taluks with the remaining 15.

W. F. Harvey.

PANJA, G. & GHOSH, S. K. **The Action of Dyes on Vibrios.** *Indian J. Med. Res.* 1943, May, v. 31, No. 1, 5–14.

Bacteriostatic and bactericidal effects of aniline dyes on organisms have been tried out since the time of EHRLICH. The authors have tested the effect of some 22 dyes of all colours upon cholera, water and other vibrios and have set out their results in a series of tables. Bacteriostatic effect was proved by the absence of development of an inoculum from a culture of freshly isolated vibrios on plates of nutrient agar mixed with the dye under test. The bactericidal properties were tested by addition of 1 cc. of a solution of the dye to 9 cc. of a peptone-water culture and further incubation for 2 to 20 hours. Results obtained on pathogenic vibrios were best with brilliant or malachite green and with crystal or methylene violet ; gentian violet, methyl violet and the other dyes were less effective. Thus brilliant green at 1 in 100,000 exerted a complete selective bactericidal effect on most Inaba and Ogawa subtypes of *V. cholerae* and on large numbers of paracholera vibrios isolated from clinical cholera cases, but was harmless to non-agglutinating vibrios isolated from Hooghly water. The persistence of green colour and clearing of turbidity in cultures were significant of sterilizing effect. No toxic effects were manifested by either brilliant or malachite green in man or animals. " Brilliant green added to cholera stools in a final dilution of 1/5000 kills the vibrios in the stools. Thirty-five cases of cholera were treated with the dye by mouth. Vibrios in the

stools disappeared earlier than in the untreated cases, but the clinical improvement was not marked as a rule, due probably to inactivation of the dye by alkaline intestinal contents." *W. F. Harvey.*

BACILLARY DYSENTERY.

ROBERTS, T. L. & DANIELS, W. B. **Succinylsulfathiazole in the Treatment of Bacillary Dysentery.** *J. Amer. Med. Ass.* 1943, July 3, v. 122, No. 10, 651–3.

This paper deals with the hospital treatment of 225 American soldiers admitted with dysentery during an outbreak in a training camp [see KUHNS, *Bulletin of Hygiene*, 1943, v. 18, 824]. The clinical infection had the features more of acute food poisoning than of dysentery :— chills, fever, headache, nausea and vomiting, cramps and diarrhoea. Stools were watery, greenish or yellowish and frequently contained mucus, but blood was noted in only 18 per cent. of the cases. The average daily number of stools on admission was 7. Prostration and dehydration were sufficiently severe in some patients to require parenteral fluids. Fever lasted for 2–3 days and diarrhoea about 4 days ; most patients made a rapid recovery. There were no complications and no deaths.

The infecting organism was the Newcastle variant of the Flexner bacillus (Boyd 88) ; it was isolated from 36 per cent. of the patients on admission. The rectal swab was preferred to faecal specimens brought to the laboratory. Succinylsulphathiazole was used in the treatment of 89 patients and there were 136 untreated controls. Dosage was 0·25 gm. per kilo. body-weight at four-hourly intervals until pyrexia and diarrhoea had ceased for two days. No significant difference in the degree or duration of diarrhoea or in the amelioration of symptoms was noted among treated and untreated cases. However, use of the drug was associated with a significant reduction in the convalescent carrier rate. In the control group, 18 per cent. of 44 patients [presumably 8] who were originally positive became carriers after clinical recovery. In the treated group, only one out of 38 (2·6 per cent.) had a positive follow-up culture, and this subject was almost certainly reinfected after return to his unit. Of the total of 89 treated cases, only this patient had a positive culture after recovery, whereas 11 per cent. of the 136 untreated controls became convalescent carriers. The average duration of the follow-up cultures was 18 days. *Robert Cruickshank.*

i. MEYER, L. F. **Chemotherapy on Intestinal Diseases in Children.** *Acta Med. Orientalia* (*Palestine & Near East Med. J.*). Jerusalem. 1943, May–June, v. 2, No. 3, 73–81, 2 figs. [12 refs.]

ii. BOGRACHOW, N. **Chemotherapy and Infantile Mortality in the "Hadassah" Municipal Hospital, Pediatrics' Service.** *Ibid.* 81–2, 3 figs.

i. Diarrhoea and dysentery in infants and young children in Palestine are most prevalent from April to November ; cases of bacillary dysentery probably form about half of the total, parenteral diarrhoea

[*i.e.* secondary to some infection outside the alimentary canal] may cause about a third, and the remaining cases are due to alimentary or climatic causes.

Treatment with sulphonamides has been used in the Hadassah Municipal Hospital at Tel Aviv since the late summer of 1941 ; and this account refers to 344 cases, mostly in infants aged 6–8 months: 220 were treated with ultraseptyl (sodium sulphamethylthiazole), 54 with sulphaguanidine, and the remainder received sulphapyridine or sulphanilamide or both. There were 196 cases with toxic symptoms (toxicosis) and 148 without ; of the former 23 (11·7 per cent.) died, of the latter only 5. Before the use of sulphonamides a 50 per cent mortality in toxic cases was regarded as normal. Sulphathiazole was found to be more effective than sulphaguanidine in toxic cases, owing, probably, to its being more readily absorbed. Both drugs showed an anti-diarrhoeal action unequalled by any drug hitherto used, sulphaguanidine being the better in this respect ; the stools became formed and normal in appearance within 3–4 days in most cases, food tolerance rapidly improved and after a week the infant could take its ordinary food. The dosage was 0·1 gm. or less per kgm. of body weight *per diem* and administration was rarely continued for more than 4–5 days.

Diet.—After one day of fasting the following diet was usually given : infants under 3 months old got sugared buttermilk, older children sugared rice gruel with one-third whey or sour milk (lemon or orange juice being used as acidifier) ; after a few days this was replaced by mashed cheese, meat, or " one of the other mashes ".

ii. The author is a colleague of Dr. Meyer at the same hospital and writes on the effect of sulphonamide treatment on the infant mortality curve. Infantile diarrhoea is the cause of the so-called " summer peak " of the infant mortality curve, and this peak disappeared after the introduction of sulphonamide treatment ; the following table shows the effect in toxic cases :—

Year	Cases of toxicosis	No. of deaths	Morfality per cent.
1940	162	93	57·4
1941	175	67	38·3
1942	172	24	13·9

A reduction in the number of deaths from pulmonary diseases also took place, but there was no change in the mortality from other causes.

J. F. Corson.

MANSON-BAHR, Philip. **The Dysenteric Disorders. The Diagnosis and Treatment of Dysentery, Sprue, Colitis and other Diarrhoeas in General Practice.**

This book is reviewed on p. 80.

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS.

SAWITZ, W. G. & HAMMERSTROM, R. J. **The Statistical Significance of a Negative Stool Examination in the Diagnosis of Amebiasis.** *Amer. J. Hyg.* 1943, July, v. 38, No. 1, 1–7, 2 figs.

In this paper the authors discuss the determination of the probability that an individual on whom a negative result has been obtained in examination for *Entamoeba histolytica* infection is actually negative, and they present formulae which they consider sufficient to enable such probability to be calculated. They state that they have found that this probability depends on the true efficiency of the technique used in examining a group of individuals and the true prevalence rate of infection in the group. *C. M. Wenyon.*

MACHADO, L. M. A amebiase intestinal no consultório do ginecologista. [**Intestinal Amoebiasis in Gynaecological Practice.**] *Brasil-Medico.* 1943, Mar. 20–27, v. 57, Nos. 12–13, 165–8.

The author in this article is not concerned with *E. histolytica* as the cause of lesions of the female genitalia. His aim is to demonstrate three types of case: (1) Patients with complaints which they attribute to the genital apparatus but which, on examination, are found to be due solely to amoebiasis, while the genital system and adnexa are quite normal. (2) Patients with similar complaints due in part to genital lesions and in part to chronic intestinal amoebiasis, of the existence of which they were completely ignorant. (3) Patients with complaints referred to the genital system who, on examination, are found to have amoebiasis which is the cause of their symptoms and at the same time " silent " pathological conditions of the genital system.

It is necessary to bear in mind, as all gynaecologists do, that the sexual apparatus plays a large part in the life of a woman and that she is prone to ascribe to the genital organs any disturbance of the lower part of the abdomen and many of her psychical aberrations.

The author, in his gynaecological practice, has studied and analysed 3,500 cases (excluding all obstetric cases). Of this total 432 (12·3 per cent.) had, for some reason or other, faecal examination made, and 146 (33·7 per cent.) showed *E. histolytica*, that is 4·1 per cent. of the total 3,500 were chronic passers of the protozoon. From the clinical, symptom-complaint, point of view he divides the patients into seven groups, namely, those with: (1) Pain in both iliac fossae, with or without intestinal disturbance—34 cases. (2) Pain in the left iliac fossa, with or without intestinal disturbance—28 cases. (3) Pain in the hypogastrium, with intestinal disturbance—28 cases. (4) Pain in the right iliac fossa with intestinal disturbance—23 cases. (5) Pain in one or both iliac fossae and intestinal disturbance in patients who had undergone appendicectomy—10 cases. (6) Periodic intestinal disturbance with or without emaciation—13 cases. (7) Patients whose faeces were examined as part of a general systematic examination—10 cases.

From the point of view of the gynaecologist he divides his findings into six categories:—

(1) Patients with normal genital apparatus whose symptoms, though imputed by them to the genitalia, were due to amoebiasis. Of

these there were 49 (33·5 per cent.). Many complained of pain in the hypogastrium or one or both iliac fossae and called it " pain in the left ovary."

(2) Patients who had gynaecological mischief and also amoebiasis, 67 cases (45·8 per cent.), the most numerous group. Some had fibromyomata with metrorrhagia, left ovarian pain and dysenteriform attacks.

(3) Patients whose symptoms, attributed to the genital system, were really due to the amoebiasis, though " silent gynaecological morbid conditions " were also found, 14 cases (9·5 per cent.). They suffered from intestinal disturbances due to the Entamoeba, but also had cervicitis or small cystocele, or Bartholin cysts, etc.

(4) Patients found, as it were by chance, to be carriers of *E. histolytica* when examined to discover, for example, the cause of pruritus, epilepsy, or anaemia ; 7 cases (4·7 per cent.).

(5) Patients who attributed their symptoms to genital sources, but who had no amoebiasis and no gynaecological lesions, 5 cases (3·4 per cent.). Among these were patients with attacks of pain in the right hypochondrium, with vomiting, coming on before their menstrual periods, and due to such conditions as biliary calculus.

(6) Lastly, those with nothing wrong gynaecologically, whose symptoms might possibly be due to amoebiasis, 4 cases (2·7 per cent.). These presented attacks of fever and, after passing through the hands of physicians and surgeons, were relegated to the gynaecologist in case some obscure focus might be the cause. In these the Entamoeba was found and the symptoms cleared up when the amoebiasis was treated. [An interesting paper.] *H. Harold Scott.*

MAY, M. Y. **Vaginitis due to** *Entamoeba histolytica*. *Indian Med. Gaz.* 1943, May, v. 78, No. 5, 250.

The author describes a case of inflammation of the vulva, with leucorrhoea of about 3 weeks' duration, in an Armenian woman of 24 years of age. Microscopical examination of fresh coverslip preparations showed active *Entamoeba histolytica*. There was no history of dysentery and the origin of the infection is unknown. The patient recovered under treatment with emetine injections. *J. F. Corson.*

BHATTACHARJEA, T. **Giardiasis—a Definite Disease.**—*Indian Med. Gaz.* 1943, Feb., v. 78, No. 2, 91–2.

Basing his observations on 52 patients who were passing cysts of *Giardia intestinalis* in their stools, the author concludes that in this infection there are definite groups of symptoms arising from irritation of the duodenum and sometimes probably of the gall bladder. This gives rise to vague pain in the upper abdomen which comes on three or four hours after meals. It is relieved by alkalis and sometimes by vomiting. Duodenal ulcers may be suspected, and patients passing from one doctor to another without a diagnosis being made are liable to become highly neurotic. Sometimes patients complain of frequent attacks of diarrhoea with the passage of mucus. Fractional test meals give a low acid curve in contradistinction to the high curve as seen in duodenal ulcer. Duodenal intubation reveals the vegetative forms of the flagellate in the duodenal contents and also in the " B "

fraction of the bile. In the "D" fraction the flagellates are much reduced in number. The author concludes that these facts indicate that the parasite is always present in the duodenum and the gall bladder when the individual is passing cysts in the stool. [It seems very doubtful whether such a conclusion is justified, though it is made with increasing frequency at the present time in those cases in which flagellates are found in the "B" fraction. It would seem to be more logical to conclude that the flagellates in the "B" fraction had not come from the gall bladder but had been dislodged from the duodenal surface by the action of the bile—a conclusion which would seem to be more reasonable till it has been shown definitely by direct observation that flagellates invade the gall bladder as frequently as some imagine.] The author claims that courses of stovarsol or atebrin by the mouth, or N.A.B. or bismuth by injection, are effective treatments for the Giardia infection. *C. M. Wenyon.*

CHAUDHURI, R. N. **A Note on Giardiasis with Steatorrhoea.** *Indian Med. Gaz.* 1943, June, v. 78, No. 6, 284–5.

The case reported is that of a woman 48 years of age who suffered from a condition resembling sprue—steatorrhoea, macrocytic anaemia, pseudo-achlorhydria. In addition there was a Giardia infection. Under treatment with liver injections and acid mixtures there was general improvement in the condition, but the steatorrhoea persisted.

The Giardia infection was then eradicated by a course of 0·1 gm. of crinodora (a substitute for atebrin) thrice daily for five days. After this treatment the diarrhoea ceased and the stools became normal in colour. It is considered possible that the Giardia infection interfered with the normal function of the small intestine so that fat absorption was impaired. *C. M. Wenyon.*

DOBELL, C. **Researches on the Intestinal Protozoa of Monkeys and Man. XI. The Cytology and Life-History of** *Endolimax nana.* *Parasitology.* 1943, July, v. 35, No. 3, 134–58, 1 text fig. & 102 figs. on 2 double pls. [40 refs.]

In this paper, the eleventh in his series of "Researches on the Intestinal Protozoa of Monkeys and Man," the author describes with his usual care his observations on the cytology and life-history of *Endolimax nana*, the smallest of the parasitic intestinal amoebae which infest monkeys and human beings. The life history is generally similar to those of *Entamoeba coli* and *E. histolytica*. The trophic amoebae become precystic amoebae which gave rise to multinucleate cysts. From the cysts there escape multinucleate metacystic amoebae which divide into uninucleate amoebulae which grow into the trophic forms. The life-history is thus simple and asexual. All stages in the life-history of *E. nana* are carefully described and figured, as also the details of its morphological structure and mode of multiplication by binary fission. The paper presents a vast amount of information which can only be satisfactorily comprehended by a careful study of the text and the two plates on which will be found over a hundred figures of all stages of development. *C. M. Wenyon.*

GUREVITCH, J. **Rare Findings of Intestinal Parasites.** *Harefuah.* Jerusalem. 1943, Aug. 15, v. 25, No. 4. [In Hebrew 63–4. English summary 64.]

"Five cases of Isospora belli are reported. Together with a previously reported case, six cases of this intestinal parasite are now known in this country. The question of the pathogenicity of Isospora belli is discussed.

"A case of Balantidiasis, probably the first in this country, is reported."

RELAPSING FEVER.

DIXON, K. C. **The Spironema of Cyprian Relapsing Fever.** *J. Roy. Army Med. Corps.* 1943, Aug., v. 81, No. 2, 89–92.

A description of the results of inoculation of guineapigs with a spirochaete obtained from a case of tick-borne relapsing fever in an Indian soldier in Cyprus, one of a series of cases among the troops. Three guineapigs and one rat were infected with the strain and each of the three guineapigs, successively infected after 4 to 12 days' incubation, showed a severe infection, with spirochaetes numerous in the blood for at least 3 weeks. The rat showed only a mild infection.

The transmitting host is said to be most probably *Ornithodorus tholozani*, and from the author's description the spirochaete would seem to be a strain of *Spirochaeta hispanica*. *E. Hindle.*

DAVIS, G. E. **Species Unity or Plurality of the Relapsing Fever Spirochetes.** *Amer. Ass. Advancement of Sci. Publ. No. 18.* 1942, 41–7. [12 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943, Sept., v. 31, Pt. 9, 176–7.]

The author reviews various criteria that have been used for the differentiation of relapsing-fever spirochaetes, *viz.*, staining reactions, cross-immunity tests, protection or neutralisation tests and pathogenicity for different hosts, and shows that none of these is satisfactory. He then discusses the value of the specific relationship between spirochaete and tick for this purpose. In experiments carried out since 1936, with some 1,600 individuals of *Ornithodoros hermsi*, Wheeler, *O. turicata*, Dugès, and *O. parkeri*, Cooley, from various parts of the United States and spirochaetes from each species, no tick transmitted spirochaetes derived from either of the other two species. On the other hand, a species from one locality never failed to transmit the spirochaetes from the same species from another locality. There was 30–100 per cent. transmission of spirochaetes derived from ticks of the same species. Anomalous results were obtained in 1940 with *O. parkeri* from California and *O. turicata*, which transmitted spirochaetes from each other, although there was an indication that the association between *O. parkeri* and the spirochaete from *O. turicata* [*Spirochaeta turicatae*] was transient. To explain this, an account is given of cross-breeding experiments with these two species, which indicated that a hereditary factor determines the transmission of strains of spirochaetes

and that some of the California ticks used in the 1940 experiment were probably hybrids. In these experiments, a virgin female of *O. parkeri* paired with a male of *O. turicata* and seven progeny were reared to the adult stage. One of the females, which engorged in the fourth nymphal stage on a mouse infected with a *parkeri* strain of spirochaetes, transmitted the infection three times when adult. Four females from this series mated with *O. turicata* and gave rise to larvae that failed to transmit spirochaetes. In the nymphal stages, many of these engorged on rats infected with *parkeri* and *turicata* strains of spirochaetes, respectively, and subsequently transmitted these spirochaetes.

O. rudis, Karsch, from South America, *O. erraticus*, Lucas (*marocanus*, Velu) and *O. moubata*, Murr., from Africa and *O. tholozani*, Lab. & Mégn. (*papillipes*, Bir.) from the Russian Union were then used in transmission experiments with strains of spirochaetes from the three North American ticks. *O. rudis* and *O. erraticus* failed to effect transmission, but *O. tholozani* transmitted *turicata* spirochaetes to a guineapig, and *O. turicata* effected 90 per cent. transmission after feeding on the guineapig infected by *O. tholozani*. However, later tests of the same batch of *O. tholozani* on white mice were negative. *O. moubata* transmitted *hermsi* and *parkeri* spirochaetes, but adults that had acquired *hermsi* spirochaetes as nymphs were dwarfed and failed to oviposit after engorgement and mating, while, although transmission of *parkeri* spirochaetes was effected up to and including the adult stage, only four females out of 12 oviposited. The progeny were given three successive feedings with negative results. Spirochaetes of the *parkeri* strain were present in the coxal fluid of females that failed to transmit when tested the second time. It is generally accepted that in *O. moubata*, transmission is effected through the coxal fluid.

Injection experiments showed that spirochaetes survived longer in the species of tick from which the strain was derived than in others, in which they were, however, shown to persist for some days. Nicolle & Anderson had demonstrated by injection the persistence of a tick-borne strain of spirochaetes in lice, but the lice did not effect transmission by feeding.

The nomenclature of spirochaetes is discussed, and it is concluded that the results of the experiments described suggest that each species of *Ornithodoros* that is a vector of relapsing fever carries a spirochaete that is tick host-specific and that this relationship offers a more accurate approach to the differentiation of spirochaetes than any of the several criteria used up to the present. The names *Spirochaeta hermsi* and *S. parkeri* are therefore proposed for the spirochaetes carried by *O. hermsi* and *O. parkeri*, respectively. [See also this *Bulletin*, 1943, v. 40, 782.]

LEPROSY.

INDIAN RESEARCH FUND ASSOCIATION. REP. SCIENT. ADVISORY BOARD FOR YEAR 1ST JAN. TO 31ST DEC., 1942, 46–53. **Leprosy Enquiry under Dr. R. G. Cochrane at the Lady Willingdon Leprosy Sanatorium, Chingleput, Madras.**

Some of the work recorded in this report has already been abstracted in this *Bulletin*, 1943, v. 40, 151. The following additional points are of

interest. Special attention has been paid by the author to leprosy in children, a vitally important subject from the epidemiological standpoint. A fresh survey was made in areas of Saidapet, Madras, mainly inhabited by weavers, and in four out of five areas the child rates were 40 per cent. or more. House or familial contact appeared to be the most important single factor in the acquirement of leprosy, 69·7 per cent. of diseased children had been in contact with an open case; there was room contact in the majority of these. Further inquiry revealed that 70 open cases had infected 141 children, and 143, or 55·12 per cent., of 259 children of 99 families in varying contact with the disease had contracted leprosy. Of 43 children showing multiple contact with cases 30 (69·75 per cent.) contracted the disease.

Re-surveys of villages to study the new cases that had arisen brought out the fact that they were fewest where night segregation of the former infective cases was highest, so this measure will be watched with interest. Lepromin tests have also been done with similar results to those of other workers. Animal experiments have yielded the usual negative results. *L. Rogers.*

DOULL. J. A., GUINTO, R. S,, RODRIGUEZ, J. N. & BANCROFT, Huldah. **The Incidence of Leprosy in Cordova and Talisay, Cebu, P.I.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 107–31, 4 figs. [14 refs.]

This paper records a valuable analysis of data obtained by intensive surveys in selected areas of the Philippine Islands with the aid of modern statistical methods. To furnish complete data all but a few of the residents were examined in special clinics. Reference must be made to the original article for the methods of analysis used; the following are the main conclusions arrived at. The authors point out that the prevalence of leprosy equals Incidence × Duration, and they regard each year of life of the infected as units of person-years. They found the combined incidence of the two areas dealt with as equivalent to 1·20 cases annually per mille population examined. Most cases, whether in household associates or other persons, occurred in the 10–14 year age group. The higher prevalence in males is attributed to higher incidence and not to longer duration of the disease. Important conclusions are reached regarding the risk of household exposure to infection. Thus, the average incidence rate per 1,000 "person-years" of household infection was 5·35 per mille, six times the rate of those not known to have been so exposed to infection. Where the primary case was cutaneous the household infection rate was eight times that of other persons, but in the case of the primary neural form the risk of infection was only about twice as great as in others not so exposed. Among persons exposed to primary cutaneous leprosy the infection rate for all ages and for the cutaneous type only was 6·16 in males against only 2·38 in females, but no sex selectivity was found in the case of exposures to neural cases. The secondary attack rates for cutaneous type only in children aged 5–9 exposed to cutaneous leprosy were still greater, namely 9·77 for males against only 2·01 for females. "This suggests greater inherent susceptibility of males rather than difference in environment as the principal cause of sex variation. Cumulation of age-specific attack rates to the age of 25 years gave an expected prevalence for all types of leprosy of 293 per mille for males and 140 per mille for females for persons exposed to primary cutaneous

cases, and, respectively, 235 per mille for males and 83 per mille for females in the case of cutaneous secondary cases. These figures are very much higher than is generally appreciated. *L. Rogers.*

MUIR, E. **Leprosy in the British West Indies and British Guiana.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War. No., 96–106.

See this *Bulletin*, 1942, v. 39, 852 and 1943, v. 40, 462 and 463.

SAUNDERS, G. M. **An Account of Leprosy in the Virgin Islands of the United States, 1841–1940.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 1–19, 3 figs.

This paper records the results of a survey of leprosy, regarding which in the Virgin Islands little was previously known. The people are very poor and live in overcrowded and insanitary conditions. Negroes make up about 80 per cent. of the 25,000 inhabitants and leprosy has been known among them from the earliest medical records. The first leprosarium was built in 1888 but could accommodate only a small proportion of the cases. A leprosy survey in 1939–40 added considerably to the 930 cases recorded during 1841–1930. The old records indicate a probable decrease of the incidence of leprosy from 1841 to 1900 and a more rapid decline during the last 40 years; in St. Thomas Island there appears to have been an increase of the disease, but this is partly due to natives of St. Croix migrating to St. Thomas. The incidence in males is 4·9 and in females 5·2 per mille. Including cases detected during the survey, approximately 70 per cent. are now of the neural type and the rate per mille of all cases is now 5·1. The recent reduction in the prevalence of leprosy is attributed to improved social and economic conditions and the isolation of cases commenced in 1888 and made fairly complete since 1910. *L. Rogers.*

SAUNDERS, G. M. & GUINTO, R. S. **A Field Study of Leprosy in the Virgin Islands of the United States.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 20–37. [12 refs.]

This paper reports the results of intensive field studies of leprosy in the Virgin Islands on similar lines to those carried out by the American Leprosy Foundation in parts of the Philippine Islands. The following are the main conclusions reached. St. Thomas has a leprosy rate of 1–1·5 per mille, ten times less than that of St. Croix with 10–14 per mille. This appears to be due to the St. Thomas people having a higher level of diet, health and sanitation. In two-thirds of the cases the first symptoms appear before the age of 20 years. A comparatively higher incidence in persons over 50 years of age indicates a decline in the incidence of the disease in the islands. The disease is about equally prevalent among males and females, as is usual in West Africans but unusual in other races, and Negroes suffer more than the other races in the Virgin Islands. In nearly 70 per cent. of cases under 20 years of age a history of contact was obtained. The lower economic classes suffer most. Less than 30 per cent. of the cases are lepromatous and over 70 per cent. neural in both males and females. *L. Rogers.*

SAUNDERS, G. M. & GIFFEN, H. K. **The Skin Lesions of Neural Leprosy in the Virgin Islands of the United States.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 38–50, 14 figs. on 4 pls.

In the course of the field study of leprosy in the Virgin Islands (see foregoing abstract) there were found 37 lepromatous, 58 active neural and 32 quiescent cases. Microscopical examinations were made in 23 early neural cases with one or more skin lesions and in seven patients in whom a diagnosis of neural leprosy had been made in 1934; details of these are recorded. In 23 of the 30 cases well-defined tuberculoid changes were found, an unusually large proportion. They were consistent with a diagnosis of leprosy although in none of the 30 cases were leprosy bacilli met with. Clinically they were well established cases of tuberculoid leprosy. Five of the seven patients first studied in 1934 showed no visible evidence of leprosy in 1940; this illustrates the well-known tendency of such mild neural cases to recover spontaneously owing to the marked resistance to the disease and its slow progress in that class of case. Recoveries of a number of the remaining 23 cases may be expected within the next few years. *L. Rogers.*

KEAN, B. H. & CHILDRESS, M. E. **A Summary of 103 Autopsies on Leprosy Patients on the Isthmus of Panama.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 51–9. [10 refs.]

The examinations reported on by the authors were carried out at the Ancon hospital in 1904–41; they form 57 per cent. of the total deaths from leprosy, and include microscopical examinations in nearly all of them. In 82 the official cause of death was given as leprosy, but an analysis of the records shows that 24 could be attributed to tuberculosis, 22 to neuritis, 15 to leprosy, 10 to heart disease, 4 to cancer, 17 to seven other common causes of mortality and the remaining 11 as many other diseases. The average age of recorded onset of the disease was 36·7 years and the average age at death 47·1 years. There was a high incidence of cirrhosis of the liver, gallstones and nephritis, and the naso-pharynx or upper or outer portion of the upper respiratory system was most affected as compared with the larynx and trachea, or lower portion of the upper respiratory system, in tuberculosis.

L. Rogers.

DHARMENDRA & JAIKARIA, S. S. **Studies of the Lepromin Test. Results of the Test with various Antigens in Non-Contacts.** *Leprosy in India.* 1943, Apr., v. 15, No. 2, 40–45.

This article reports further attempts to find a diagnostic allergic skin test for leprosy, through the use of a specific antigen of the leprosy bacillus, on the lines of the lepromin reaction. What is wanted is an antigen which will give no reactions in persons who have always lived in an area free, or practically so, from leprosy, but which gives positive reactions in mild early neural leprosy, in which there is most need of differentiation. The various fractions of lepra bacilli separated by the Calcutta workers [see this *Bulletin*, 1942, v. 39, 228, 855] were therefore tested in places in the Punjab plains where leprosy incidence is extremely low. Although none of them proved to be specific for leprosy, yet the nucleo-protein extracted from the bacilli by the phosphate-buffer method gave the fewest reactions in Punjab subjects; only 5 per cent.

were positive when the dose injected was limited to 0·002 mgm., a dose that gives positive results in most neural leprosy cases. The investigation is therefore being continued. *L. Rogers.*

INDIAN RESEARCH FUND ASSOCIATION. REP. SCIENT. ADVISORY BOARD FOR YEAR 1ST JAN. TO 31ST DEC., 1942, 44–6. **Leprosy Enquiry under Dr. John Lowe at the School of Tropical Medicine, Calcutta.**

This report deals almost exclusively with the lepromin researches already abstracted in this *Bulletin*, 1942, v. 39, 226, 227, 228; 1943, v. 40, 316 and 317.

PITT, L. A. Estudio electrocardiografico en cincuenta enfermos de lepra. [**Electrocardiographical Study in Fifty Lepers.**] *Rev. Argentina de Dermatosifilologia.* 1943, June, v. 27, No. 2, 258–68.

In 50 cases of leprosy, of various forms, no electrocardiographic changes were seen which could be attributed to leprosy.
Charles Wilcocks.

DOULL, J. A. & BRYAN, Eunice E. **Natural Antitoxin in Blood of Leprosy Patients in Puerto Rico.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 60.

In this brief note the authors record finding in the blood of 22 leprosy patients in various stages of the disease less than 0·002 unit of diphtheria antitoxin in one case, from 0·01 to 0·1 in two, from 0·1 to 1·0 in 14, and more than 1·0 unit in the remaining five patients. These amounts are substantial and show no such deficiency as to indicate treatment with diphtheria antitoxin or toxoid. *L. Rogers.*

SCHUJMAN, S. & MERCAU, R. **Treatment of Leprosy with Diphtheria Toxoid.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 61–7, 1 pl.

This is a careful detailed report of 11 cases of leprosy treated with diphtheria toxoid: 10 lepromatous and 1 tuberculoid in type, the latter included for comparison. Spontaneous improvement in other than lepromatous disease makes it important that, for a test of the value of any new treatment, only lepromatous cases should be used. Clinical and bacteriological examinations were made every two weeks, but at no time in the course of five months was any improvement observed, for three remained stationary and the other eight became evidently worse, with the appearance of new lesions and increase in the numbers of the leprosy bacilli. *L. Rogers.*

FAGET, G. H. & JOHANSEN, F. A. **The Diphtheria Toxoid Treatment of Leprosy. Final Report.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 68–78, 3 pls.

This is a full report on an impartial and carefully controlled trial of this treatment at Carville U.S.A. National Leprosarium, with tabulation of the 35 treated cases and of controls. [For the preliminary report see this *Bulletin*, 1942, v. 39, 698.] Doses, gradually increased from 0·5 to 3 cc., were given every two weeks at first and continued

in 1 cc. doses at monthly intervals up to one year. Tests showed that the leprosy patients as a group had a higher diphtheria antitoxin content in their blood than control healthy adults and that they were all Schick negative. Moreover, a substantial increase in the titre developed during the treatment, so there is no evidence that their diphtheria antitoxin neutralized the toxins of leprosy. The final evaluation of the treated cases showed 3 improved, 8 stationary and 24 worse, against respectively 3, 14 and 18 in the control group. Sedimentation tests and changes in general health, as shown by the weight of the patients, both yielded figures in favour of the control series. Lepra reactions were increased by the treatment, as was the occurrence of severe leprous neuritis. The unanimous conclusion of the staff of the leprosarium was that " diphtheria toxoid is productive of no good and is fraught with danger for the patient with leprosy."

L. Rogers.

CARPENTER, C. M., ACKERMAN, Helen & ASHENBURG, N. J. **The Failure of Diphtheria Toxoid to influence the Course of Experimental Murine Leprosy.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 79–81.

Owing to difficulty in evaluating any treatment in such a chronic disease as human leprosy the authors have tested the diphtheria toxoid treatment on 29 white rats infected with two murine strains, in which both strains produced similar disease, usually within 2 to 3 months. It is unnecessary to give full details of the experiments because the treatment completely failed to influence the character of the lesions, the course of the disease or the length of time the animal survived after inoculation, whether the toxoid was injected early or late in the course of the disease. [In view of the data recorded in the above three papers, which are in conformity with a number of other recent reports, it must regretfully be recognized that there is no pathological or clinical basis to support the diphtheria toxoid treatment.] *L. Rogers.*

MUIR, E. **Treatment of Perforating Ulcer of the Foot.** *Leprosy Review.* 1943, July, v. 14, No. 2, 49, 51–3.

This paper records recent experience of the author in treatment of both superficial and deep perforating ulcers of the foot; the latter being complicated by necrosis, usually of a metatarsal bone. In the superficial ulcers, in addition to antiseptic dressings, infiltration of 1 to 2 cc. of hydnocarpus oil into the surrounding subcutaneous tissue may be of use. When bone necrosis is present operative measures, which should not be too conservative, are necessary to ensure permanent healing. Metatarsectomy is indicated through an incision in the sole beginning at the ulcer and extending the whole length of the affected bone. After removal of the bone the sides of the ulcer should be dissected out, the wound trimmed and the edges undercut to enable them to be brought together, and deep sutures applied. The wound usually takes three or four weeks to heal, and crutches should be used for four more weeks to keep the foot off the ground until the fibrous tissue has consolidated. Improvement in the general health follows when exercise can be taken. *L. Rogers.*

DAVEY, T. F. **Leprosy Control in the Owerri Province. Fourth Annual Report on Control Work undertaken by the Staff of the Native Administration Leprosy Settlement, Uzuakoli.** *Leprosy Review.* 1943, July, v. 14, No. 2, 54–64.

This report gives an encouraging account of anti-leprosy work in a Nigerian Leprosy settlement. During 1942, 15 out-patient clinics were opened, bringing the number around the central colony up to 44; over 11,000 patients were treated every week with the help of educated leprosy inspectors and male nurses trained at the headquarters. In addition 14 model leprosy villages have been constructed on land provided by the native chiefs, and 20 more are under construction at the cost of the people. In these the infectious cases are voluntarily isolated and treated; those requiring hospital attendance are sent to the central settlement, where over 35,000 dressings were supplied during the year. That work is the basis of the systematic control of leprosy in the province, which includes house-to-house surveys to detect and isolate the infectious persons and to treat regularly the earlier cases at the clinics, from which several hundred patients have already been discharged recovered. For example, in one such area the third survey revealed only 40 new cases among 7,000 people, all of them in an early amenable stage of the disease; the highly infective patients are isolated in the model villages and the disease is thus under considerable control and should very greatly decrease within a few years. The success of these measures is thus demonstrated, but unfortunately the staff, of two missionary doctors with several Toc H and other lay workers, is too small to enable many urgent requests of the people for extensions of the work to be undertaken until increases are made in the post-war period, when sufficient staff and funds should enable the most serious leprosy problem of the British Empire, outside India, to be tackled with every hope of success. *L. Rogers.*

ROGERS, L. **Progress in the Control of Leprosy in the British Empire.** *Internat. J. Leprosy.* Manila. 1942, Dec., v. 10, Spec. War No., 87–95.

The work dealt with has already been recorded in this *Bulletin.*

DHARMENDRA. **What the People should know and do about Leprosy.** *Leprosy in India.* 1943, Apr., v. 15, No. 2, 46–56.

HELMINTHIASIS.

ROMEU CANÇADO, J. **Incidence of Intestinal Parasites in a Tropical Area of Brazil. Figures based on the Examination of the Stools of 2,500 Patients.** *Amer. J. Digestive Diseases.* 1943, Mar., v. 10, No. 3, 98.

This is a continuation of the work reviewed in this *Bulletin,* 1942, v. 39, 5. In the examination of the faeces of 2,500 persons from Bello Horizonte and its neighbourhood, the author used concentration

methods (of Hoffmann, Pons and Janer; de Rivas; or Faust) in most cases. The commonest protozoa and worms were :—

Entamoeba histolytica	in 10·4	per cent.
Giardia intestinalis ...	,, 10·0	,,
Trichuris trichiura ...	,, 20·5	,,
Ascaris lumbricoides ...	,, 19·5	,,
Necator americanus ...	,, 14·6	,,
Strongyloides stercoralis	,, 8·6	,,
Schistosoma mansoni...	,, 4·0	,,

Charles Wilcocks.

BALDWIN, E. **An *in vitro* Method for the Chemotherapeutic Investigation of Anthelminthic Potency.** *Parasitology.* 1943, July, v. 35, No. 3, 89–111, 11 figs. [29 refs.]

The author describes a method for testing the potency of anthelmintics and other compounds on segments of the whole body of *Ascaris lumbricoides* of the pig, which are cut off transversely from the rest of the worms. Two such segments are used. One is the anterior end of the worm as far back as 2 cm. from the anterior tip; this portion contains the nerve ring and its ganglia, which lie about 1·5 mm. behind the anterior tip. The second segment, called the intermediate preparation, is the portion of the worm between points about 3 mm. and 2·8 cm. in front of the genital pore; this portion is regarded as being a nerve-muscle preparation free from nerve ganglia. Both segments contain portions of the intestine, the anterior one containing the muscular oesophagus.

These preparations are ligatured off with fine sewing silk before they are cut away; the posterior ligature is attached to a hook at the bottom of a small test chamber; the anterior ligature is attached to the recording lever of a kymograph, which records the movements of the segment as it works against a load of 0·25–1·5 gm. (usually 0·5–0·75 gm.).

The test chamber is surrounded by a water bath kept at 38–39°C., through which pass the supply pipes which lead to it either the solution or suspension of the compound to be tested or the saline medium in which the normal reactions are recorded. This medium was devised by the author and he was able to keep Ascarids alive in it for 10–11 days, but used for his experiments only healthy-looking females which had not been in the laboratory longer than 48 hours. An ingenious arrangement allows for the rapid emptying of the test chamber and its filling with a test compound and also for a slower flow used for washing the worm segments after they have been mounted. The test chamber is small in order to economize the use of the compounds tested. A diagram of the apparatus explains its action.

The normal movements of the worm segments were first recorded and analysed. These records were then compared with records taken under similar conditions when the test chamber was filled with solutions or suspensions of 58 anthelmintic and other compounds. The concentrations used were mostly from 1 : 1,000 to 1 : 5,000. The results of these are compared with those obtained by earlier workers who also used some of the compounds tested by Baldwin. These workers have used whole Ascarids, tied-off pieces of Ascaris and pieces of Ascaris muscle. Some of them have used earthworm muscle for such tests, but Baldwin's tests of earthworm muscle show that its reactions to some powerful drugs are very different from those of segments of whole Ascaris body. Very low concentrations of adrenaline, pilocarpine and acetylcholine, for example, powerfully affect earthworm

muscle but are among several drugs which have no effect on Baldwin's segments of Ascaris. Among these inactive drugs are cocaine, morphine, strychnine and three sulphonamides. The only recognized anthelmintics among them are filix mas, pelletierine, gentian violet and phenothiazine ; the two former are not used for nematode infestations ; and gentian violet is used only for infestations with Enterobius ; the reasons for the failure of phenothiazine are being investigated.

The active compounds tested produced different reactions in the two kinds of worm segment. Compounds acting chiefly on the anterior segment, containing the nerve ring and ganglia, were santonin, arecoline hydrobromide, coumarine, amytal and chlorbutol. References in the literature to the variable action of santonin are discussed. In concentrations of 1 : 50,000 it paralysed the anterior segments in a few minutes ; none of the other compounds tested had anything like this effect. Baldwin has also found [*Pharmaceut. Jl.*, 1943, July 17] that Beta-santonin derived from Indian species of Artemisia had a similar but much weaker effect, while a pseudo-santonin of unknown nature from the same source had no effect. On the intermediate segments santonin itself at a concentration of 1 : 50,000 has no effect, but at a concentration of 1 : 5,000 it causes marked stimulation. Baldwin thinks that santonin stimulates the hinder part of Ascaris to some extent but suppresses the coordinating impulses from the nerve ring and ganglia so that the worm is more easily expelled by the host, especially if a purgative is given. The other compounds tested which acted on the anterior segments appeared to do so in a similar way, but required much higher concentrations (1 : 1,000). The activity of the tapeworm remedy, arecoline hydrobromide, is interesting in contrast with the inactivity of the other tapeworm remedies, filix mas and pelletierine.

Compounds acting on both the anterior and intermediate segments are more numerous. They include such well-known anthelmintics as hexylresorcinol, which was most active of them all, beta-naphthol, thymol, nicotine, oil of chenopodium, carbon tetrachloride, tetrachlorethylene, and dichlorobutane. For details of the differences between the actions of these compounds the paper must be consulted.

Baldwin's results agree with those of LAMSON and BROWN [this *Bulletin*, 1936, v. 33, 577], who used whole Ascarids for their tests. His results indicate that anthelmintics do not all act in the same way. Much more knowledge of nematode physiology is necessary before their mode of action can be explained. His method has, he says, the limitations inherent in any *in vitro* method and it cannot be used to test drugs which act otherwise than on the neuro-muscular mechanism, but it is economical of materials, does not require exceptional skill, gives a visible record of the effects of compounds tested and can be used to obtain approximate quantitative data. It is useful for the detection of promising compounds which should be tested later on infested hosts. [Since Baldwin's paper was written, a large number of new compounds have been made and tested by this method.] *G. Lapage.*

MARILL, F. G. Recherche des Mollusques fluviatiles autour de grands barrages d'Algérie. [**Snails in the Streams around the Great Dams of Algeria.**] *Arch. Inst. Pasteur d'Algérie.* 1943, June, v. 21, No. 2, 65–82, 2 maps. [Refs. in footnotes.]

As a great extension of irrigation has been planned in Algeria, the question of an increase of breeding places of snails of the genus

Bulinus and a spread of bilharziasis has to be considered. The author, therefore, investigated the conditions in the neighbourhood of two large dams, that of Foum el Gueiss and that of the river Ksob, which are used for irrigation. He searched the streams and the networks of canals at both places but found no molluscs. Analyses of samples of water taken from various parts of the systems indicated that the water was too acid or insufficiently alkaline to allow Bulinus to live, but it was observed that it became more alkaline towards the terminal canals of the network.

The author remarks that his observations were incomplete and need verification. *J. F. Corson.*

DUREN, A. Une épidémie de bilharziose intestinale à Lemfu (Congo Belge) en 1923. [**An Epidemic of Intestinal Bilharzia at Lemfu, Belgian Congo, in 1923.**] *Ann. Soc. Belge de Méd. Trop.* 1942, Dec. 31, v. 22, No. 4, 253–6.

The author recalls an outbreak in children attached to a mission. The eggs of *Schistosoma mansoni* were found in the stools of most of the patients, and it is noted that the symptoms closely resembled those of dysentery, the faeces containing blood and mucus. In a pool in which the children frequently bathed were found snails closely resembling *Planorbis salinarum*, and tentatively named *P. kisantuensis* by DUPUIS.

In discussion SCHWETZ remarks that *P. salinarum*, on further investigation, will probably be incriminated as an intermediate host.

Charles Wilcocks.

LI, Y. & CHIEN, Y. C. **Cecocolic Intussusception in a Case of Schistosomiasis Japonicum.** *Chinese Med. J.* 1942, Oct., v. 61A, No. 1, (Chengtu Edition, v. 1, No. 1), 25–8, 2 figs.

The authors describe a chronic caeco-colic intussusception associated with the presence of eggs of *Schistosoma japonicum* in a female opium smoker aged 37, who died in Shanghai in 1930. No detailed clinical history could be obtained. At autopsy the patient was found to be extremely emaciated. From the anus protruded a rounded mass 5 cm. long and 4 cm. in diameter with spiral folds; the "proximal part of the colon from the caecum to the distal transverse colon could not be seen." Part of the ileum was invaginated into the descending colon about the region of the splenic flexure; the adjacent ileum was dilated and oedematous and the colon enlarged and distended; the appendix had been passively drawn into the intussusception but was not itself invaginated. Ragged undermined brownish ulcers were present on the mucosa of the intussusception, and the mucous surface of the intussusception was dark reddish with similar ulcers.

Sections of the lower part of the intussusception showed very recent necrosis of the mucosa with many congested and thrombosed blood vessels and superficial ulcers; the submucosa showed marked thickening by granulation tissue containing many collections of calcified schistosome eggs. Sections at the level of the ileo-caecal valve showed haemorrhagic and necrotic villi; schistosome eggs were present in the appendix with fibrosis round them. The ulcerated parts of the intussusception showed complete necrosis of the mucosa with schistosome eggs in the submucosa and in the muscle layers.

The authors briefly discuss other recorded cases and the mechanism of intussusception. They think that in this case the ulcers and granulation tissue due to the presence of the schistosome eggs induced local spasm which led to intussusception. Appendicitis was not a contributory cause. The fact that the caecum was completely invaginated and formed the apex of the intussusception favours, the authors think, KAPPELER's view that if, as LORENZ suggested, the caecum normally invaginates more or less when it empties itself, any local exciting agent, such as a schistosome infestation, may convert this physiological invagination into a pathological intussusception like the one here described. But in this case there may have been also a congenital imperfect attachment of the caecum and adjacent colon to the abdominal wall, as well as a " long and lean mesentery ".

G. Lapage.

SZIDAT, L. Was ist *Cercaria ocellata* La Vallette? Morphologische und entwicklungsgeschichtliche Untersuchungen ueber den Erreger der europäischen Cercarien-Dermatitis des Menschen. [**What is *Cercaria ocellata?* Morphological and Developmental Researches on the Cause of European Cercarial Dermatitis of Man.**] *Deut. Trop. Ztschr.* 1942, Oct. 1 & 15, v. 46, Nos. 19 & 20, 481–97; 509–24, 19 figs. [36 refs.]

The author gives in some detail the history of work on species of cercariae which can penetrate the human skin and cause dermatitis, although their adult stages are not parasitic in man, *e.g.*, *Cercaria elvae*, *C. douthitti*, *C. physellae*, *C. stagnicolae*, *C. tuckerensis*. The adult stage of only one of these species (*C. douthitti*) is known, it is *Schistosomatium douthitti* in rats and mice. The unnamed cercaria of *Schistosomatium pathlocopticum* is a sixth American species which may possibly cause dermatitis.

Cercarial dermatitis of bathers, similar to that known in the United States, occurs in Europe, especially in Germany; VOGEL showed that it is due to the penetration of the skin by the cercaria named *C. ocellata* by LA VALETTE ST. GEORGE in 1855. Szidat summarizes subsequent work on this species and describes his own work on it in East Prussia. He concludes that *Cercaria ocellata* of La Valette includes several species of schistosome cercariae. The structure, excretory systems and biological behaviour of these are very similar.

In *Limnaea palustris* and *L. ovata* Szidat found, in addition to cercariae of *Bilharziella polonica*, three new cercariae of the *ocellata* type. These were *Cercaria neocellata*, n. sp., in *L. palustris*; the relation of this species to *Trichobilharzia kossarewi* is discussed; *C. parocellata*, n. sp., in *L. ovata*; and *C. pseudocellata*, n. sp., in *L. palustris*. These three new species were best distinguished by Brumpt's method of killing by heat. Each is described and a table shows the diagnostic details of each. They differ from *C. ocellata*, La Valette, in that they do not attach themselves to the substratum by their ventral suckers, but remain suspended in the water. Apart from *S. haematobium* in Portugal and Greece and *S. bovis* in Sicily and Sardinia 11 species of Bilharzia are at present known in mid-Europe, most of them occurring in birds, so that at least 11 different cercariae are to be expected; but probably there are many others as well. Several schistosome cercariae from *Limnaea stagnalis* and *Planorbis septemgyratus* are of the same size as *C. neocellata*; but it is uncertain whether these belong to closely

related species of Bilharzia or whether the cercariae can use other snails as well as their chief intermediate host, which is *L. palustris*. Szidat discusses his conception of parallel development between parasite and host, pointing out that cercariae of Bilharzia species decrease in size with the increase in organization of their vertebrate hosts and at the same time the number of the terminal ciliated cells of their excretory systems decreases.

Further spread of cercarial dermatitis in the open bathing places of big towns is to be expected as the urbanization of wild aquatic birds, such as ducks, gulls, swans and divers, increases. *G. Lapage.*

PRIOR, A. P. **A Case of Cerebral Cysticercosis.** *Jl. Roy. Army Med. Corps.* 1943, May, v. 80, No. 5, 278–80, 1 fig.

The patient was an East African native admitted to a military hospital with pneumonia. Within a few hours he passed into a condition of status epilepticus, but there was no previous history of epilepsy; he died in 24 hours. At post mortem cysticerci were found in the cerebrum but not elsewhere in the body. There was no evidence of disintegration, calcification or of cellular response in the surrounding cerebral tissue; the cysts were "healthy" and "symbiotic".

The author points out that the case was unusual in that it required the presence of an acute infective condition to bring to light the cerebral symptoms, and in that symptoms were caused by "symbiotic" cysts. He surmises that, under the stimulus of the acute systemic disease, the cysts imbibed fluid, thus becoming tense and causing symptoms. As a rule the parasite becomes dangerous only when disintegration and calcification set in, and when cellular changes occur in the cerebral substance. *Charles Wilcocks.*

BERNALES, S. E. & ENCINAS, E. Cisticercosis cerebral con sintomatologia de tumor con localización a predominio ponto-cerebelosa. [**Cerebral Cysticercosis with Symptoms of a Ponto-Cerebellar Tumour.**] *Rev. de Neuro-Psiquiatria.* 1943, Mar., v. 6, No. 1, 1–57, 49 figs. [14 refs.] French summary.

This is a detailed account of the morbid anatomy of parts of the brain involved in an infection with *Cysticercus cellulosae.*

The patient, a native of Peru, had had symptoms suggestive of the presence of an intracranial tumour for over two and a half years before his admission to the hospital at Lima, Peru. There were few signs pointing to a diagnosis of cysticercus infection but it was suspected from the indications of widespread lesions. A differential cell count of the blood showed 5 per cent. of eosinophile leucocytes.

The first symptoms were tinnitus and increasing deafness; these were followed (in order of their appearance) by signs of lesions of the 7th, 5th, 3rd, 4th, 1st, 9th and 12th cranial nerves; of lesions of the cerebellum, pyramidal tracts and finally signs of bulbar compression shortly before death.

Post-mortem examination showed many small cysts in the ponto-cerebellar area on both sides and in other parts of the brain. There was marked pachymeningitis and a special kind of neuroglial reaction forming a sort of meshwork around the blood vessels. The substance of the brain showed much inflammatory and degenerative change. These lesions are described in detail and illustrated by many photomicrographs.

No cysts were found in any other parts of the body. [See also DIXON & SMITHERS, this *Bulletin*, 1936, v. 33, 102.]

J. F. Corson.

RAO, S. S. **The Result of Amputation of a Limb for Filarial Lymphangitis and Elephantiasis.** *Indian Med. Gaz.* 1943, Feb., v. 78, No. 2, 79, 1 fig.

The author of this short note states that in India the after-histories of patients who have undergone amputation of a limb for elephantiasis have not been reported. He describes the condition of a man aged 34 whose leg was amputated, because of elephantiasis and recurring lymphangitis, in 1932. He remained free from lymphangitis until 1936, when the remaining leg was affected for the first time, and since when the attacks have recurred and elephantiasis has developed. The amputation stump is also affected. The amputation, therefore, has not conferred any benefit beyond relieving the patient of the weight of the elephantoid tissue. *Charles Wilcocks.*

ROTH, H. **The Role of the Intestinal Phase of Trichina Infection in the Establishment of Immunity to Reinfection.** *Amer. J. Hyg.* 1943, July, v. 38, No. 1, 99–111.

In an earlier paper [this *Bulletin*, 1940, v. 37, 660] the author showed that a single experimental infection with a relatively small number of larvae of Trichinella confers on guineapigs a long-persisting, high-grade immunity to reinfection; and that this is primarily due to a defence mechanism in the intestine directed against the number and longevity of adult worms coming from the second experimental infection. Was this immunity due solely to the permanent presence in the muscles of larvae derived from the first experimental infection (resistance to superinfection) or to the brief acute stage of the initial infection (a true acquired immunity) during which there were adult Trichinellae in the intestine for several weeks or larvae were migrating to the blood and settling in the muscles? To decide this question it was necessary to isolate a single phase of the infection, *i.e.* either the intestinal infection or the infection of the blood or muscles. To do this the author utilized the sexual differentiation of the larvae pointed out by BUGGE (*Arch. f. wiss. Tierheilk*, 1934, v. 68, 24–32). It was possible to infect guineapigs with either male or female larvae, so that adult Trichinellae were obtained in the intestine which were either male or female; no copulation could therefore occur, so that there could not be any larval migration or infection of the blood or muscles. ANDERSON and LEONARD [*J. Parasitol*, 1940, v. 26, Suppl., 42–43] infected rats with either male or female Trichinellae by duodenal transplantation of adult worms from other rats and obtained a high-grade immunity. Roth obtained larvae by artificial digestion and the male and female larvae were isolated by microscopical examination, a tedious and laborious process. Of all the larvae examined only 35–40 per cent. were male. The general plan was to infect male guineapigs only with either male or female larvae and some five to nine weeks later to examine their muscles by biopsy for larvae. Larvae were found in the muscles of some of these guineapigs, *i.e.* the isolation of male and female larvae was not always successful, so that some guineapigs received both male and female larvae; these were discarded. To the

others, in whose muscles biopsy failed to reveal larvae, doses of both male and female larvae were given, some 6–17 weeks after the initial infection with either male or female larvae. The number of larvae in seven test muscles of the guineapigs (the masseters, diaphragm, upper parts of the forelegs and shanks of the hind legs) was then estimated.

The author claims that the results indicate that a single purely intestinal infection with Trichinellae of one sex only (*i.e.* without larval migration to the blood or muscles) will confer a more or less marked immunity to normal reinfection with larvae of both sexes given 6–17 weeks later. The muscles of 10 guineapigs given 100–300 male or female larvae and then given 500–600 mixed male and female larvae contained from 0·1 to 86 per cent. of the average number of larvae in the muscles of controls. When 25 guineapigs were given 160–400 male or female larvae and then doses of 1,000–2,000 larvae of both sexes (which killed all the controls within 8 weeks) 11 of these 25 (44 per cent.) survived for eight weeks and their muscle infection was only a fraction of what might have been expected. The sex of the larvae initially given did not matter ; the immunity was produced by either male or female larvae. The time between the initial dose and the test dose could be varied from 1–4 months without appreciable difference in the immunity conferred. But the number of the larvae and their vitality, which was affected by the time elapsing between the beginning of the artificial digestion by which they were obtained and the time when they were fed to the guineapigs, was of some importance. Even a few larvae (4 male and 8 female, *i.e.* the normal sex ratio) given together often protect guineapigs better against the lethal effect of 1,000 larvae than 200 male or 320–400 female larvae. When either male or female larvae are given separately they persist in the intestine as long as six weeks, just as Trichinellae do in normal infections. Roth thinks that this immunity conferred by the intestinal phase of Trichinella alone is a true acquired immunity and that it will be much greater when larvae are present in the blood and muscles.

G. Lapage.

ROSE, H. M. **On the Occurrence of Forssman Antigen in** *Trichinella spiralis*. *J. Immunology.* 1943, July, v. 47, No. 1, 53–7. [13 refs.]

" In seventeen cases of trichinosis the titers of agglutinins and hemolysins for sheep's erythrocytes were found to be within normal limits. Similar findings were obtained in two rabbits infected with *Trichinella spiralis*.

" Rabbits immunized against sheep's erythrocytes and guineapig's kidney did not develop precipitins for trichinella-antigen.

" The evidence available at present does not warrant the conclusion that *Trichinella spiralis* contains the Forssman antigen."

DEFICIENCY DISEASES.

RAMAN, T. K. **Teleroentgenography of the Heart in Beriberi.** *J. Indian Med. Ass.* 1943, Aug., v. 12, No. 11, 309–12, 1 diagram & 8 figs.

"1. Teleroentgenography of the heart in beriberi was studied in 15 cases from 28 plates.

"2. The heart was enlarged in 14 (93·33 per cent.) of the cases.

"3. The enlargement was observed in all the chambers in the following order: (*a*) right ventricle, (*b*) right auricle, (*c*) left ventricle and (*d*) left auricle.

"4. Treatment either by vitamin B_1 or by liberal diet reduced the size of the heart in 10 of the 11 cases. The actual reduction in size could not be observed in the remaining 4 cases, since a single picture only was taken.

"5. Five cases showed prominent pulmonary conus and reduction in the size of the conus was observed in 3 cases after treatment.

"6. Two cases showed prominent superior vena cava and the shadow disappeared in both the cases after treatment.

"7. One case showed congestion of the lungs as a result of heart failure."

TSATSAKOS, D. Der Brenztraubensäuregehalt des menschlichen Blutes bei Pellagra. [**The Pyruvic Acid Content of Human Blood in Pellagra.**] *Klin. Woch.* 1943, June 26, v. 22, No. 26/27, 442–4. [15 refs.]

The author discusses the chemical reactions between co-zymase and the blood sugars. For estimating the pyruvic acid content he used the method of Clift and Cook which essentially consists in estimating iodometrically the bisulphate combined with the pyruvic acid after its liberation by the action of sodium bicarbonate. Union of the bisulphite with other carbonyl substances is destroyed by heating the solution for an hour with dilute alkali. The details of the process are thus given :—

Three cc. of whole blood are pipetted into 12 cc. of 10 per cent. trichloracetic acid ; this is then filtered and to 5 cc. of the filtrate are added 3 cc. of N/NaOH with one drop of 1 per cent. alcoholic solution of thymolphthalein, and the mixture heated in a water-bath for an hour. After this is cooled, N/H_2SO_4 is added to bring the *p*H to 2. One cc. of the bisulphite solution is added and the mixture left to stand for 15 minutes. The free bisulphite is removed by decinormal iodine solution, the liquid becoming a pale blue. Excess is got rid of by centinormal thiosulphate (the blue colour disappearing). N/100 iodine is added till the colour returns, which disappears again by addition of 5 cc. bicarbonate solution, and the final product is titrated with N/100 iodine, 1 cc. of which corresponds to 0·44 mgm. of the pyruvic acid.

A table is given of 20 estimations of the blood sugar in gm. per litre and the pyruvic acid in mgm. per 100 cc. of blood, in healthy subjects, in pellagrins, and in those with other diseases. This shows that the normal is under 0·4 mgm. per cent., whereas in pellagrins it is increased to 1–1·6 mgm. (In beriberi it is nearly double this, 2·7 mgm. and is ascribed to the reduction of co-carboxylase in states of vitamin B_1 deficiency.) The increase is due to incomplete decomposition or dismutation of the pyruvic acid in the body. *H. Harold Scott.*

GAUGIER, P. & FERRY, W. La pellagre chez les mangeurs de manioc au Congo Français. [**Pellagra in Manioc-Eaters in the French Congo.**] *Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* Brazzaville. 1943, Jan., v. 2, No. 1, 18–28.

NICOL, R. Observation d'un cas de pellagre. [**A Case of Pellagra.**] *Ibid.* 29–41, 6 figs. [15 refs.]

In the first article are set out the case records of four native patients in Brazzaville ; in the second, one of these cases is dealt with in greater detail. A diagnosis of pellagra was made, the symptoms being similar in all cases. It is therefore only necessary to consider the more detailed description of the single case, seen in the fifth annual relapse. Each attack was identical with the previous one and described previously as an " eruption bulliforme indéterminée et stomatite " preceded by high fever. The bullous eruption appeared first on the hands and feet, both surfaces, and then spread to limbs and body, including the mouth, scrotum and penis. The bullae healed, leaving pigmented macules with depigmented centres and upon the latter the bullae of the next attack appeared. The lips, tongue and mouth were also involved. There was some conjunctivitis and lachrymation and in one case papillitis, but no peripheral neuritis. The authors lay stress upon the fact that these patients were manioc eaters. Mixed vitamins and yeast were given as treatment.

[If these signs were merely listed, anyone unfamiliar with pellagra might think he recognized that disease, but if the accounts are read critically and the photographs viewed carefully it would probably be agreed that the disease described is not pellagra but a type of pemphigus of recurring type or a bullous type of erythema multiforme. They may somewhat resemble hydroa-aestivale. The reviewer remembers seeing similar cases years ago in Central Africa and they do not in reality resemble pellagra. The patients in Brazzaville were almost certainly suffering from dietetic deficiencies and if these were rectified doubtless restoration to health would be hastened, but this does not prove any specific relationship between the disease and the deficiencies. The reviewer has written at some length lest these cases be accepted as pellagra, and also with the hope that the several authors will be able to deal further with the interesting affection they have recorded.]

H. S. Stannus.

CLARKE, A. G. & PRESCOTT, F. **Studies in Vitamin B Deficiency with special reference to Mental and Oral Manifestations.** *Brit. Med. J.* 1943, Oct. 23, 503–5, 6 figs. on 1 pl. [16 refs.]

These " studies " relate to some " 17 cases of vitamin B complex deficiency in patients treated primarily for nervous disorders. This represents 2% of the patients seen by us in the out-patient department of the West End Hospital for Nervous Diseases. Originally they were mostly classified as suffering from functional nervous disorder, and with one exception were women."

Notes of seven cases are reproduced, which will serve to draw attention to a type of deficiency disease which may easily pass unrecognized. The diagnosis depended on the history of malnutrition and response to treatment.

A list of symptoms common to vitamin B complex deficiency and psychoneurosis is given, but diarrhoea, sweating, backache, phobias

and anxieties are stated to occur in the latter but not in the former. [There is some error here, as of course these symptoms are common in pellagra.]

[Reference is made to published cases since 1934 but no mention is made of the summary of all cases published in Great Britain up to that date which appeared in the *Quarterly Jl. Med.*, N.S. v. 3, 223. Another point needs comment—in speaking of oral lesions the authors appear to be unable to differentiate between the affection of the lips associated with riboflavin deficiency and conditions produced by poorly-fitting dentures, lipstick, chewing gum, etc. Without wishing to appear dogmatic the reviewer believes that with care it should be possible to make a differential diagnosis. The presence or absence of corneal vascularization is not mentioned.] *H. S. Stannus.*

MITRA, K. **Oro-Genital Syndrome in Avitaminosis. Effect of Treatment with B_2 (Complex) Vitamins.** *Indian Med. Gaz.* 1943, July, v. 78, No. 7, 330–36. [26 refs.]

After a very incomplete reference to the history of the group of symptoms, which the author rather unfortunately refers to as the "oro-genital syndrome," the results of treatment of small groups of boys and adults in two residential institutions in Patna province are recorded. The symptoms were those well known and commonly associated with riboflavin deficiency with the exception that no patient complained of his eyes. Dimness of vision is, however, not specifically mentioned and no slit-lamp examinations of the cornea were made. The angular stomatitis, glossitis and scrotal dermatitis responded to riboflavin given either by oral or parenteral route. Nicotinic acid was of no value, nor had shark oil any effect.

H. S. Stannus.

TISDALL, F. F., MCCREARY, J. F. & PEARCE, H. **The Effect of Riboflavin on Corneal Vascularization and Symptoms of Eye Fatigue in R.C.A.F. Personnel.** *Canadian Med. Ass. J.* 1943, July, v. 49, No. 1, 5–13, 9 figs.

In this interesting communication the authors give their experiences in an attempt to arrive at the causation of symptoms of eye fatigue in members of the Royal Canadian Air Force and to assess its relation to corneal vascularization due to riboflavin deficiency. To give their conclusions first: the incidence of vascularization of the cornea among apparently healthy young adults in Canada is surprisingly high, and seems to vary inversely with the amount of riboflavin-containing food in the diet (milk). Riboflavin in large doses over a period of two months decreased the vascularization of the cornea, and the symptoms of eye fatigue, in a large percentage of men exposed to glare while flying. Early examination of the men revealed that various stages of corneal vascularization occurred. Whereas the optimal daily intake of riboflavin is placed at 2·5 to 3·0 mgm., the R.C.A.F. rations before June 1st, 1942, averaged 1·6 mgm. only. It was further considered that since riboflavin is destroyed by light more would be necessary for those individuals exposed to much bright light.

The authors point out the difference of opinion held by different observers in regard to the normal vascular supply to the limbus but they believe that congestion of this area is abnormal. They have divided

their cases into normal—showing no proliferation of the vessels of the limbic plexus and no penetration of the cornea by vessels; abnormal—*stage* 1: an eye showing proliferation of the vessels of the limbic plexus but no penetration of the cornea, or penetration only by tiny twigs in one or two sharply localized areas, *stage* 2: the same but penetration of the cornea by twigs and "streamers"; *stage* 3: as in 2 but with the added formation of loops. Of 198 men engaged in flying and exposed to glare over water 0·5 per cent. were placed in the normal group; 8·6 per cent. in (1), 43·9 per cent. in (2), and 46·9 per cent. in (3). Of the stage 3 men 67 per cent. *on specific enquiry* complained of two or more of the following symptoms—tiredness of the eyes, aching, watering, sandy sensations, headaches, reading intolerance, decreased visual acuity—worse after flights in bright weather. Seventy men were divided into three groups. To group A 3·3 mgm. riboflavin were given thrice daily for two months; to group B the same for one month; to group C a placebo.

Symptoms were checked and photographic records made of the cornea, at intervals of two weeks; a specially devised camera (of which a short account is given) was used for the recording.

Of the 28 men in group A, 20 (71·4 per cent.) showed either marked improvement, obvious by glance at the photograph, or moderate improvement, which was apparent when comparison of photographs was made and a study, vessel for vessel, carried out. Twenty of 21 who had had symptoms no longer complained. Of 21 men in group B, 6 (28·6 per cent.) showed the same result. Of 21 men who received the placebo none showed any improvement; 6 of them were worse.

Progress was slow and continued over the whole two months. Had the trial terminated in two weeks, few of the subjects would have shown any obvious change. *H. S. Stannus.*

WISEMAN, R. H. **Confusion between Scurvy and Tropical Myositis with reference to an Outbreak of Scurvy among Prisoners.** *East African Med. J.* 1943, Aug., v. 20, No. 8, 263–77, 2 charts. [18 refs.]

The author gives an account of a condition which he saw among civilian prisoners at Narok, Kenya, characterized by pain and swelling in a leg and consequent difficulty in walking. The part affected, commonly the calf, was brawny and hot and tender, and the skin red and shiny. No pus or other fluid was obtained on incision. A composite picture of the ten cases dealt with presented:—

(*a*) Painful, tender muscular swellings involving particularly the calf muscles and popliteal spaces but also muscles of the thigh and, in one case, the neck muscles.
(*b*) Swelling in the regions of the ankle joints.
(*c*) A periosteal node, in one case.
(*d*) Gingivitis and pyorrhoea.
(*e*) Anaemia, gradual in onset and progressive in character.
(*f*) Gradually developing asthenia and loss of weight.

But none of the patients showed all these symptoms; only three had oedema of the ankles, only two gingivitis or pyorrhoea. Investigation of the diets of those affected revealed a marked lack of vitamin C and the giving of lemons was followed by rapid improvement.

[The author labels the condition definitely as scurvy; it is, perhaps, a small point, but would it not be wiser to diagnose it as an outbreak associated with hypovitaminosis C, since hardly any of the classical

symptoms were present? The author refers to GLEITSMANN's paper (see this *Bulletin*, 1942, v. 39, 893) where the reviewer pointed out the little likelihood of confusing tropical pyomyositis with the Bornholm disease. The present abstracter repeats that such confusion ought not to arise. Bornholm disease has for synonyms epidemic myalgia, epidemic myositis (if swelling of muscle occurs), epidemic pleurisy or pleurodynia, and the pain is in the trunk muscles, most often the thorax, and there is fever, sweating, shallow respiration, a lull after 24 hours or so and, in many cases, a return of the pain in another 24–48 hours and recovery in four or five days—totally unlike tropical pyomyositis or the cases recorded here.] *H. Harold Scott.*

VENOMS AND ANTIVENENES.

SERGENT, E. Symptomes graves d'envenimement scorpionique succédant à une amélioration trompeuse. [**Recurrence of Grave Symptoms in Scorpion Poisoning after Treatment with Specific Serum.**] *Arch. Inst. Pasteur d'Algérie.* 1942, Dec., v. 20, No. 4, 357–8.

The severe symptoms of scorpion poisoning usually disappear rapidly after treatment with specific serum and after a few hours there is no longer any danger. In 17 out of 221 cases, however, which have occurred during the past seven years and been recorded from time to time in previous numbers of these *Archives* [see this *Bulletin*, 1943, v. 40, 485, 486] death occurred in spite of serum treatment. Grave symptoms suddenly reappeared after a period of amelioration following an injection of specific serum, and death followed even, in some cases, when a further injection of serum was given.

The author gives short notes of these cases; in nine of them he thinks that life could have been saved if the patients had remained under observation and serum been given as soon as grave symptoms reappeared. He concludes that patients should be kept under observation for several hours after the first injection of serum even if they are apparently recovering. *J. F. Corson.*

SERGENT, Et. Sur un scorpion du sud marocain (*Hottentota gentili* Plry). [**A Scorpion of Southern Morocco,** *H. gentili.*] *Arch. Inst. Pasteur d'Algérie.* 1943, June, v. 21, No. 2, 83–8, 4 figs. (1 map) & 4 pls.

DERMATOLOGY AND FUNGOUS DISEASES.

IRIARTE, D. R. El carate en Venezuela. [**Pinta in Venezuela.**] *Rev. Med. Trop. y Parasit.* Habana. 1942, Nov.–Dec., v. 8, No. 6, 75–81, & 1943, Jan.–Feb., v. 9, No. 1, 1–7, 12 figs. (1 map).

An excellent account of carate, el pinto (it has several other synonyms), the details being given under 11 headings. Abstract cannot do it justice and the whole article deserves translation *verbatim*. Here we can do little more than indicate the contents, adding a few remarks on some of the points. The author starts with a brief relation of the history of the disease, its origin and geographical distribution. It seems to have been known in America before the discovery of the continent in 1492 and the name carate (or carare) appears to be of Carib origin. There is no evidence of the African slaves introducing it; it is not known in Africa. Its distribution in Venezuela is variable and incidence is highest in the south and the north-west. In some Mexican States it is very common: in Guerrero 23·6 per cent. of a population of just over half a million; in Mexico State 34·6 per cent. of 93,763 population; of nearly two and a half million in 15 States 270,685, or 10·84 per cent., were affected. In Venezuela, with which this article is more particularly concerned, the State of Barinas shows high incidence. In the municipalities of Pedrazas and Quebrada Seca it is more than 50 per cent. and the average for the whole State is 10 per cent. Twelve of the 20 States and two Federal Territories into which Venezuela is divided are affected.

The second chapter deals with the aetiology. From 1898 to 1927 it was believed to be mycotic and various moulds were isolated; among these were *Aspergillus nidulans*, *Fusarium sanguineum*, *Cephalosporium curtipes*, *Penicillium cyaneum* and other species. From 1927 onwards the spirochaete, *Sp. herejoni*, has been shown to be the cause and the moulds to be mere concomitants. Chapter III is concerned with transmission, the insect vector being thought to be *Simulium exiguum*. Next, the age and sex prevalence and the symptomatology are detailed. Mexican figures covering a "large number" of cases give 638 in children up to 10 years, 471 from 10–20 years, 53 from 20–30 years, 61 from 30–40 years, 19 between 40 and 50, and 11 over 50 years. Among 281 cases in Barinas State, Venezuela, the author gives the following: Under one year 1 case; 2–5 years 12; 6–9 years 32; 10–14 years 53; 15–25 years 74; 26–40 years 67; 41–69 years 40, and one case in each of the next two decades. As regards sex, he gives 118 males and 173 females [=291]. He next speaks of the blood picture and the serum reactions. In Colombia MENK found 69·5 per cent. giving a positive W.R.; the Commission in Mexico found 125 positive among 130, two were anticomplementary and only three were negative. Chapter VI considers the coexistence of cardio-vascular lesions, and Chapter VII the histopathology of carate. The differential diagnosis from chloasma, pityriasis versicolor, keratosis nigricans palmaris, syphilis, nerve leprosy, Addison's disease and, lastly (and chiefly), vitiligo. Points of distinction between white pinta and vitiligo are given in a table which is worth reproducing (see below).

The last sections (or chapters, as the author calls them) consider briefly prognosis, relapse, reinfection and immunity; prophylaxis and treatment. Reinfection may undoubtedly occur. Prognosis in the old days when the cause was believed to be mycotic was regarded as

much more favourable—at all events was more cheering to the patient—than it is now that the cause is known to be a spirochaete and that infection does not confer immunity. The treatment recommended is by arsenicals (as neosalvarsan) to begin with and bismuth to follow up. The author appends a list of the names and ages of his 281 patients and the districts from which they came.

White Pinta	Vitiligo
Areas affected nearly always hypochromic. Achromic over areas exposed to pressure, as knuckles, knees, ankles, elbows.	Areas affected usually completely achromic.
Lesions dry, usually scaly and desquamating.	Skin appears normal; no xerodermia or desquamation.
Rarely affects the genitalia, scalp, or flexures.	Often on these sites. The hair of head and genitalia often white.
Patient almost certainly comes from one of the endemic zones.	May come from anywhere.
Serological reactions, Wassermann or Kahn positive in practically all cases.	If these reactions are positive they are due to concomitant syphilis and not to the vitiligo.
Arsenic and bismuth will cure lesions except the achromic spots which do not clear up.	Generally incurable. Mercury, bismuth, arsenic are quite without effect.

H. Harold Scott.

CONANT, N. F. & HOWELL, A. **The Similarity of the Fungi causing South American Blastomycosis (Paracoccidioidal Granuloma) and North American Blastomycosis (Gilchrist's Disease).** *J. Invest. Dermat.* 1942, v. 6, 353–70, 4 pls. [Summary taken from *Rev. Applied Mycol.* 1943, Sept., v. 22, Pt. 9, 309–10.]

The writer describes and discusses his comparative studies on eight cultures obtained from cases of South American blastomycosis or paracoccidioidal granuloma (three of which were referred to *Paracoccidioides brasiliensis* and two to *P. cerebriformis*), and seven of the North American form of the disease (*Blastomyces dermatitidis*), isolated from patients at the Duke Hospital, Durham, North Carolina. The media used were Sabouraud's dextrose, beef infusion, beef extract, blood, and glycerine agars, and two series of tests were run, one at room temperature and the other at 37°C. All the strains were tested for pathogenicity by intraperitoneal injections on white mice with 1 cc. of a 1 : 200 suspension (by volume) of the yeast-like form produced in one-week-old cultures on blood agar at 37°.

All the isolates of *B. dermatitidis* at room temperature exhibited, at one time or another, the three cultural types assigned to this fungus, viz., mealy, prickly, and filamentous. In the early stages of growth,

the hyphae intermingled with the single or budding, round, thick-walled elements, 7 to 18μ in diameter, were broken up into arthrospores, 4 to 6 by 2 to 2·5μ, but as development proceeded, the growing ends narrowed to 1·5 to 2μ in diameter, septa appeared at intervals of 10 to 15μ, and numerous raquette cells, intercalary chlamydospores, and atypical hyphal swellings were observed in the submatrical mycelium : by this time the *Oidium*-like appearance of the colonies had disappeared. The production of aerial mycelium was accompanied by the formation of sessile, round to oval conidia, 3 to 4μ in diameter, and of a round to piriform type, 4 to 5μ in diameter, borne on lateral sterigmata of varying length. Round to piriform chlamydospores, 7·5 to 18μ in diameter, with thick, sometimes wavy, peculiarly sculptured walls reminiscent of *Scedosporium*, developed in profusion in old cultures.

On transference to the incubator, the cottony, aerial growth of the room-temperature cultures became either smooth and waxy or cerebriform and wrinkled. The yeast-like, budding forms of the fungus were accompanied by short, thick-walled, square-ended cells of the *Oidium* type, occurring singly or in chains of three or four. The process of conversion from the filamentous to the yeast-like type of growth was followed microscopically in van Tieghem cell cultures inoculated with the mycelial form and incubated at 37°.

B. brasiliensis (the name applied to the various South American strains) was characterized in the early stages of growth at room temperature by cerebriform colonies, which subsequently became covered with a short, aerial, filamentous, white to light brown growth. Many round to piriform, thick-walled budding forms, 3 to 25μ in diameter, were present at first, and the mycelium was composed of thick-walled cells, 4 to 7 by 2 to 3μ, which readily dissociated into arthrospores. In older cultures numerous intercalary and terminal chlamydospores and atypical hyphal swellings were produced by the submatrical mycelium, while round to piriform, sessile conidia, 3 to 25μ in diameter, developed on the short aerial mycelium.

At 37°, five of the South American strains consisted mainly of round, multiple budding cells, with a few short, moniliform chains of two to five cells, while in the other two strains the relative proportions were reversed ; the buds produced on the surface of the large, thick-walled cells were round to oval, 1 to 15μ in diameter, or bacilliform.

The differences observed in the cultural development and clinical behaviour of the North and South American blastomycoses are considered to be of specific rather than of generic importance. *B. dermatitidis* is retained (pending the general acceptance of a more appropriate name) for the agent of the North American disease, and the various designations proposed for the South American granuloma relegated to synonymy with *B. brasiliensis*.

MOORE, M., COOPER, Zola K. & WEISS, R. S. **Chromomycosis (Chromoblastomycosis). Report of Two Cases.** *J. Amer. Med. Ass.* 1943, Aug. 28, v. 122, No. 18, 1237–43, 8 figs. [Refs. in footnotes.]

Two cases of chromomycosis are here reported. In the first the lesion was of five years' duration and affected the left wrist, consisting of a plaque only 2·5 cm. in diameter. The second patient showed a small lesion of the helix of his right ear of two months' duration only. This latter lesion was diagnosed as carcinomatous and was therefore excised

by means of the cautery. For this reason the causative lesion could not be isolated, but subsequent microscopical examination revealed many fungus cells dispersed throughout an intense cellular exudate. It was proved that the wrist verrucous and granulomatous growth was caused by *Phialophora verrucosa*, this being the sixth proven case to be reported in continental United States. The cases are described in full detail as are the organism and the microscopical observations.

Sydney Thomson.

DOBES, W. L. **Moniliasis of the External Ear Canal.** *Southern Med. J.* 1943, Sept., v. 36, No. 9, 614–16, 2 figs. [15 refs.]

"The yeast-like fungi most frequently encountered are the (1) Monilias, (2) Cryptococci, and (3) Mycodermas. The Monilias are subdivided into several strains, of which Monilia albicans is considered pathogenic and Monilia candida, Monilia parapsilosis, Monilia krusei and other strains are considered saprophytic. In 1922 Greenbaum and Klauder reported 35 strains of yeast-like organisms and concluded that yeasts are found normally on the skin and may, under certain conditions, become pathogenic and cause superficial infection . . . . Benham and Hopkins cultured the skin of 100 normal individuals and among the yeast-like fungi, those most frequently encountered were the cryptococci and mycodermata. A few non-pathogenic species of monilia were encountered, but Monilia albicans was never found . . . . From these recent works the term moniliasis has been restricted to a definite group of dermatoses in which the species, Monilia albicans, can be found."

ASHFORD's work on sprue is then reviewed, and reference is made to cases in which various organs have apparently been directly involved. Among the diseases broncho-pulmonary infection, osteomyelitis, meningitis, vaginitis and stomatitis are mentioned. It is stated that intertrigo which has well-defined, bright red, exuding patches with scalloped borders is recognized as a dermatosis from which *Monilia albicans* can usually be cultured. Few cases of invasion of the external auditory meatus have been reported. In the instance recorded here the patient was a white woman aged 36 years. There were greasy, scaly patches of seborrhoeic eczema over the back of the neck and ears whilst the area over the mastoid region showed an acute oozing eczema. The canal of the left ear showed a dark mould-like growth, moist and involving most of the circumference of the canal. At the distal end was a whitish patch of wet blotting-paper-like appearance about 0·5 cm. in diameter obstructing the view of the tympanic membrane. The right ear showed a similar but small patch of foul material. On the floor of this meatus was a moist purulent material covering an inflamed and oedematous base. Cultures from this gave growths of *Monilia albicans*, whilst those from the mould-like growths showed *Aspergillus fumigatus*. The lesions all healed after daily ten-minute soaking with a 2 per cent. solution of gentian violet.

"Culture tubes of Sabouraud's medium (Weidman's modification) in which the hydrogen ion concentration is from four to four and eight-tenths, will retard the growth of bacteria and allow a luxuriant growth of fungus at room temperature. The growth in most cases can be observed in two to five days."

Sydney Thomson.

González Ochoa, A. & De Los Angeles Sandoval, M. Estudios sobre cinco especies del genero Candida Berkhout 1923, causante de lesiones humanas. [**Study of Five Species of the Genus** *Candida* **Berkhout 1923 causing Lesions in Man.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1943, June, v. 4, No. 2, 149–61, 6 pls. English summary.

The members of this genus, Candida, have usually been regarded as harmless or, at most, as capable of causing lesions of little significance, though Tulipan and Muskatblit [below] have recorded generalized moniliasis of skin and mucosae, and Wikler *et al.* [below] a mycotic involvement of the endocardium and brain. The authors have studied certain species isolated from lesions in man—onychia, folliculitis, from the sputum of patients with cough and fever, or bronchitic signs, occasionally with haemoptysis, but in which the tubercle bacillus could not be found, from squamous erythema of axilla and chest and a superficial ulcer of the thigh.

The following species were isolated from the lesions : *C. guillermondi*, *C. albicans*, *C. parakrusei*, *C. deformans* and *C. pseudotropicalis*. Cultivation was obtained on Sabouraud glucose (2 per cent.) and in Raulin's fluid medium. The authors describe their morphological characters, their fermentation reactions and what they call auxanograms, a biological term which they do not attempt to define. [No experimental work is referred to such as might tend to show that these moulds were of aetiological significance and not merely concomitants or accidental contaminants.] *H. Harold Scott.*

Tulipan, L. & Muskatblit, E. **Generalized Moniliasis with Proved Pathogenicity. Report of a Case.** *Arch. Dermat. & Syph.* 1942, Nov., v. 46, No. 5, 643–50, 4 figs.

Wikler, A., Williams, E. G., Douglass, E. D. & Emmons, C. W. **Mycotic Endocarditis. Report of a Case. With Histologic Report** by R. C. Dunn. *J. Amer. Med. Ass.* 1942, May 23, v. 119, No. 4, 333–6, 2 figs.

van Pernis, P. A., Benson, Miriam E. & Holinger, P. H. **Laryngeal and Systemic Histoplasmosis (Darling).** *Ann. Intern. Med.* 1943, v. 18, No. 3, 384–93, 3 figs. [Summary taken from *Rev. Applied Mycol.* 1943, Sept., v. 22, Pt. 9, 307–8.]

The clinical course and post-mortem observations in a case of laryngeal and systemic histoplasmosis (*Histoplasma capsulatum*) in a 63-year-old Latvian male, a preliminary account of which has already appeared [this *Bulletin*, 1942, v. 39, 109], are fully described. Tissues and exudates removed from the larynx five months before death were cultured on various media at 37°C. and at room temperature, growth being easily obtainable in three to five days and persisting, predominantly in the mycelial form, through numerous subcultures. The organism develops on many kinds of decaying material, both in sunlight and darkness, the latter condition, as well as humidity, being conducive to growth. *H. capsulatum* succumbs to one hour's autoclaving at 15 lb. pressure or half-an-hour's freezing, but was very refractory in dextrose broth cultures to common acids, alkalis, and sulphanilamide derivatives, though showing no resistance to thymol, potassium permanganate, or tartar emetic.

Yeast forms of the fungus, 2 to 4μ in diameter, were recovered from four out of 15 white mice injected intraperitoneally with 2 to 3 cc. of a heavy suspension of the mycelial stage, to which they reverted on subculture. Large yeast cells, similar to those described by Moore, were recovered from one of the mice, but on subculturing changed into smaller yeast forms and eventually into the mycelial phase. Cultures from the spleen and liver of mice inoculated with the large yeasts gave rise to the mycelial stage with typical chlamydospores.

TOMB, J. W. **The Treatment of Tinea (Dhobie's Itch).** *J. Trop. Med. & Hyg.* 1943, Feb.–Mar., v. 46, No. 1, 6.

Tomb quotes a case in which a patch of tinea circinata had persisted over the sub-sternal notch for 20 years in spite of treatment with many preparations. It was finally cleared by two applications, at an interval of 10 days, of Zephiran Concentrate (10 per cent.) (Bayer). This is described as "an aqueous solution of a mixture of alkyldimethylbenzylammonium chlorides." It is practically non-irritating to healthy skin, but causes itching, burning, and the formation of bullae in diseased areas, which desquamate in three or four days.

Charles Wilcocks.

LANDOR, J. V. **Dermatitis Venenata caused by Smoke.** *Brit. J. Dermat. & Syph.* 1943, Jan., v. 55, No. 1, 17–19.

The author has only been able to find two references in the literature to dermatitis being caused by smoke. Both of these refer to the burning of branches of the Mango Tree (*Mangifera indica*, Anacardiaceae) but neither account gives details of actual cases. During August 1940 thirteen patients, men, women and children, were seen in Singapore. Each case showed the typical acute vesicles chiefly affecting the exposed parts of the body. All the cases had arisen in one "coolie line" of the brickworks. Investigations proved that firewood from the "Banjai" tree had been used in the kitchen. This wood was later identified as the bark of *Mangifera caesia*. Experiments with the steam distillate from this wood reproduced the typical vesicular lesions within 24 hours.

Sydney Thomson.

MISCELLANEOUS.

TRANS. ROY. SOC. TROP. MED. & HYG. 1943, Sept., v. 37, No. 2, 71–88. **Discussion on Modern Drugs in the Prevention and Treatment of Tropical Diseases** [JAMES, S. P.; SCOTT, H. H.; HAWKING, F.; HANSCHELL, H. M.; HOWIE, J. W.; NICOL, W. D. & SHUTE, P. G.; BIGGAM, A. G.; ADAMS, A. R. D.].

Col. S. P. JAMES, in opening the discussion, recalled the researches on malaria in cases of general paralysis made by YORKE and MACFIE at Liverpool in 1924 [this *Bulletin*, 1925, v. 22, 50]; these were followed by work at the Ministry of Health Malariatherapy Centre at Horton Hospital, Epsom [this *Bulletin*, 1931, v. 28, 566 & 973; 1932, v. 29, 693; 1933, v. 30, 73 & 76] done by the speaker and his colleagues. He next referred to the recommendations of the Malaria Commission

of the League of Nations [this *Bulletin*, 1933, v. 30, 837] and went on to speak of experimental work on avian malaria and the theory of the existence of an exo-erythrocytic cycle of the human malaria parasites in the cells of the reticulo-endothelial sytem in man [this *Bulletin*, 1937, v. 34, 589 ; 1938, v. 31, 255]. He approved of beginning the treatment of human malaria with at least one "shock producing dose" of an antimalarial drug.

Dr. Frank HAWKING referred to the chemotherapeutic studies of YORKE and his co-workers on trypanosomes, particularly the use of a technique which enabled the action of drugs to be studied *in vitro* [this *Bulletin*, 1930, v. 27, 237] and went on to discuss the action of sulphonamides in various infections. He emphasized the need for estimating the concentration of drugs in the blood and advocated the use of large initial doses of such drugs as germanin (Bayer 205) and mepacrine (atebrin).

Dr. H. M. HANSCHELL spoke of his experience with propamidine in the treatment of chancroid ulcers, lymphogranuloma inguinale and infection with *Trichomonas vaginalis*.

Major J. W. HOWIE related some observations made with Tanret reagent on the urine of persons who had taken quinine ; 53 fit men took 5 grains of quinine daily and all showed positive Tanret reactions in one or more specimens of urine, but in only 20 cases did the positive result appear within one hour after taking quinine and many were again negative within 12 hours. The test was used in 100 patients with acute malaria who were receiving 30 grains of quinine daily ; in 88 patients a positive reaction was obtained in every specimen of urine, while in 7 of the remaining 12 patients the reaction was uniformly negative, and was irregular in the other 5. The 7 negative patients were given quinine by intramuscular injection and the reaction became positive and remained positive when the quinine was continued by mouth. Such a test is valuable and easily carried out.

Dr. W. D. NICOL suggested that the suppressive use of quinine might produce neurosis and thought that all antimalaria drugs should be withheld from a man on his arrival in the United Kingdom and until a relapse occurred. He described an experiment made on 4 persons ; two of them took atebrin, 0·1 gm. daily on 6 days each week (total 0·6 gm. per week) and the other pair took 0·2 gm. on Saturdays and Sundays only (0·4 gm. per week). This was continued for three weeks, then all were bitten twice a week for three weeks by mosquitoes heavily infected with a Rumanian strain of *Plasmodium falciparum*. After this the atebrin was continued as before, one pair taking it for four weeks and the other pair for eight weeks. No infection resulted but 10 controls became infected within the normal incubation period. He concluded that the sporozoites were destroyed soon after their injection by the mosquitoes.

Major-Gen. A. G. BIGGAM suggested that work on the blood concentration of atebrin may show that large initial doses should be given.

Dr. A. R. D. ADAMS said that in Liverpool they found that 30 grains of quinine a day by mouth for three successive days invariably arrested the clinical attack ; last year they treated about 1,000 cases of malaria mostly acquired in West Africa. They rarely gave quinine by the parenteral route. Recently they had been using mepacrine (atebrin) to forestall relapses.

Col. JAMES replied. *J. F. Corson.*

KING, P. Z. **Epidemic Prevention and Control in China.** *Chinese Med. J.* Washington. 1943, Jan.–Mar., v. 61, No. 1, 47–54.

This article gives interesting information, first, of epidemic diseases occurring in China, and, second, of the organized control body which is to be a headquarters " nation-wide epidemiological intelligence service " and to coordinate all civil and military anti-epidemic activities. Among epidemic diseases plague and cholera have long taken a foremost place in China. A sinister and new development in epidemiology is the finding that the Japanese, as part of their totalitarian methods, have adopted the barbaric procedure of bacterial warfare. " Dr. R. Pollitzer, epidemiologist of the National Health Administration and . . . other senior members " consider that " evidence strongly suggests that the Changteh plague was caused by enemy action and that plague infected fleas were most probably embedded " in scattered grain and rags. Other diseases than plague and cholera which are important causes of morbidy and mortality are malaria, dysentery, typhus, relapsing fever, diphtheria and smallpox.

The organized epidemiological service which established an office for emergency epidemic control in 1940 has its intelligence service ; its anti-epidemic corps ; quarantine services ; venereal disease treatment stations ; bathing, delousing and anti-scabies stations ; provincial and anti-epidemic units. These are certain to be highly important organizations in the post-war medical restoration in China. *W. F. Harvey.*

MUMFORD, E. P. & MOHR, J. L. **Background to Post-War Reconstruction. Part I. Preliminary Report on Parasitic and other Infectious Diseases of the Japanese Mandated Islands and Guam.** *Amer. J. Trop. Med.* 1943, July, v. 23, No. 4, 381–400, 1 map. [82 refs.]

The Japanese mandated islands are situated between the equator and lat. 20 N. and between long. 130 and 170 E. ; they include the Palau, Marianas, Caroline and Marshall groups. The American island of Guam is among the Marianas Is.

The authors discuss the prevalence of the more common parasitic and infectious diseases which have been reported from these islands and remark that only 4 (yaws, dengue, filariasis and climatic bubo) of the 66 diseases mentioned are restricted to warm countries. [Climatic bubo or lymphogranuloma inguinale occurs also in Europe and America and probably other parts with a temperate climate.] The most prevalent and important diseases appear to be yaws, gonorrhoea, tuberculosis, conjunctivitis, ankylostomiasis and ascariasis. Tuberculosis has been reported to be the leading single cause of death on Guam. *Ascaris lumbricoides* is said to infect over 90 per cent. of the inhabitants and is thought to be associated with a disease somewhat like asthma and called *Guha.* Filariasis is reported but seems not to be prevalent ; undulant fever, malaria and plague have also been reported but, so far, they do not appear to have become established.

J. F. Corson.

TRINIDAD AND TOBAGO. **Report of the Agricultural Policy Committee of Trinidad and Tobago (Part I).** (Second Printing.) 142 pp. 1943. Govt. Printer. [50*c*.]

This report contains remarks on nutrition and health and sanitation in the section on policy, which are of interest to Colonial medical men.

Charles Wilcocks.

LILLIE, R. D. **A Giemsa Stain of Quite Constant Composition and Performance, made in the Laboratory from Eosin and Methylene Blue.** *Pub. Health Rep.* Wash. 1943, Mar. 12, v. 58, No. 11, 449–52.

The author discusses the variations which are liable to occur in Giemsa stain as a result of variations in the composition of the constituent dyes. It is noted that the character of the product resulting from the oxidation of methylene blue with a definite proportion of potassium bichromate is fairly constant, and it is proposed that the eosinates of such crude azures be substituted for the usual constituents of Giemsa stain. In the paper full details of the method of preparation are given. *C. M. Wenyon.*

LILLIE, R. D. **Blood and Malaria Parasite Staining with Eosin Azure Methylene Blue Methods.** *Amer. J. Pub. Health.* 1943, Aug., v. 33, No. 8, 948–51.

Many American preparations of Giemsa's stain were found to be unsatisfactory for staining thick blood films. The ingredients were examined spectroscopically and various mixtures tested and a satisfactory Giemsa stain is now on the market. Considerable variations in results were also found when commercial samples of Wright's Romanowsky stain were tested; the differences were apparently connected with the method of polychroming. Spectroscopic examination and tests of solutions of various ages and composition showed that Wright's stain should have "initial absorption maxima between 650 and 660 mμ." [written also 660$\mu\mu$, or 0·660μ, or 6600Å].

J. F. Corson.

PERSIA AND IRAQ FORCE, DIRECTOR OF MEDICAL SERVICES. MEDICAL MEMORANDUM No. 4 OF 1943. 34 pp., 6 folding figs. **Effects of Heat in Persia and Iraq.** Republished with amendments June 1943.

[A somewhat shorter version of this publication appears in the *South African Digest of War Medicine*, 1943, July, v. 3, No. 1, 2–14.]

This memorandum is of the greatest value; it should be closely studied by all medical officers in charge of troops in hot climates. The remark is made that "during the hot weather of 1942, nearly three-quarters of the cases of general effects of heat among troops in Persia and Iraq occurred before, during and after disembarkation. Many of them could have been prevented had adequate precautions been taken on board ship." In the aetiology of conditions due to heat the exogenous factors of high atmospheric humidity (with a wet bulb temperature of 83°F. as the danger point), rapid dehydration, deficient intake of fluid or salt, and lack of rest are mentioned. The endogenous factors include non-acclimatization, alcoholism, fevers and diarrhoea. "Illnesses associated with high fever, or vomiting are especially dangerous." [It will be remembered that BULMER (*Bull. War Med.*, 1943, v. 3, 623) reported that in Libya all the patients sent to his hospital with a diagnosis of heat stroke were found to be suffering from malaria, sandfly fever or septicaemia.]

Microscopic examination in fatal cases of heat hyperpyrexia shows great venous engorgement of all organs, with haemorrhagic pulmonary oedema and multiple haemorrhages, sometimes in the brain. The cause of death is usually circulatory failure.

Clinical differentiation of various types of the effects of heat is not always easy; the types are not clear-cut, and one may progress to another. The classification given in this memorandum is as follows :—

Heat exhaustion; common and not usually serious. It is, in fact, a fainting fit, with normal temperature, but is often associated with heat cramps [see below].

Subacute effects of heat.—These are important; the onset is insidious and there is an almost apyrexial period of increasing derangement of the body chemistry, with a final phase of high fever. The condition begins with lassitude and headache, going on to nausea and vomiting, giddiness and insomnia. Frequency of micturition, and either constipation or diarrhoea, may occur. The mentality of the patient may change to dulness or irritability. Signs of dehydration begin to appear, and the amount of chloride in the urine is usually below normal.

This stage usually lasts for 7–10 days, but may be longer; unless checked it may progress to hyperpyrexia.

Acute heat stroke.—In this form the failure of the heat-regulating mechanism is sudden, and an apparently healthy man may be attacked so quickly that he is already unconscious when found. Usually there is delirium, coma or convulsions; the skin is dry, the temperature may reach 112°F., the face is congested and the muscles rigid. The cerebrospinal fluid is normal in appearance and its pressure is only rarely raised. [Nevertheless, it would seem wise to perform lumbar puncture; this would reveal cases of meningitis, and, if the fluid is clear, but under pressure, may be a useful therapeutic measure (see Corr, this *Bulletin*, 1942, v. 39, 721).] A warning is given that over-rapid removal of cerebrospinal fluid may lead to the formation of a dangerous pressure cone which may compress the medulla in the foramen magnum.

Heat cramps are seen characteristically in ship stokers. They are caused by deficiency of sodium chloride, due to excessive sweating.

Treatment of the severe states must be instituted at the earliest possible moment; a delay of a few hours may mean the death of the patient. The essentials are a cool atmosphere, rest, replacement of fluids and salt, and reduction of body temperature either by imitation of the process of evaporation of sweat, or by immersion in a cold (but not too cold) bath. Cooling measures must be stopped when the temperature has fallen to 102° (from 106°) or 104° (from 109°), to avoid dangerous collapse. Antipyretic drugs are dangerous.

Fluid must be given in large quantities—as 0·25 per cent. saline drinks if the patient can swallow, or as intravenous normal saline. The fluid and salt requirements should be regulated by the appearances of dehydration, the blood concentration (estimated by red cell count or percentage of haemoglobin), the amount of urine, the amount of chloride in the urine (usually low), and the blood pressure (usually low). Intravenous saline is indicated if the systolic blood pressure is below 100 mm.

A balance sheet of fluid intake and output should be kept, and fluid should be given in large quantities until the total output balances the total intake. In this balance sheet at least 8 pints must be allowed for the daily loss of fluid, by sweating, of a man at rest, in a moderately cool room in hot weather. Intravenous administration of fluid, however, calls for the greatest care; the cardiovascular system may not be able to deal with it. Signs of this are failure of the blood

pressure to rise, absence of clinical improvement, and pulmonary oedema. Some patients may take as much as 20 pints, others have been drowned by 9.

It must not be forgotten that nourishment is needed; sweetened diluted tinned milk may be used, or 5 per cent. glucose may be added to the intravenous saline. Hypertonic saline (1·5 per cent.) may be used for the first pint of intravenous fluid.

In case of need, circulatory stimulants such as caffeine or coramine, and artificial respiration, may be beneficial.

It is often difficult to exclude malaria; if there is the slightest doubt, 8 to 10 grains of quinine must be given, very slowly, by the intravenous route.

After-treatment demands care and should be prolonged.

In prevention, acclimatization is supremely important. Healthy men became acclimatized in a few weeks, but during that period constant supervision is necessary. The men should be given lectures on the precautions necessary in hot climates, general physical fitness should be promoted, medical officers should be constantly vigilant to detect the preliminary stages described above, adequate ventilation of the men's quarters must be ensured, ample supplies of water must be made available, and a daily ration of $\frac{3}{4}$ oz. of salt (*i.e.* $\frac{1}{2}$ oz. in the ration and $\frac{1}{4}$ oz. extra issue) must be taken daily for several days before entering heat stroke areas, and continued as long as these conditions obtain. The minimum daily fluid requirement in the hot season is 10 pints; it is stated that a man doing hard manual work may take almost 4 gallons.

In appendices are given :—A. Tests for chlorides in urine; B. Lists of equipment for heat stroke wards and centres; C. Instructions for constructing air-cooling apparatus (working on the principle of loss of heat by the evaporation of water); D. Special instructions for ships, and E. Equipment suitable for treatment on board ship.

The test for chlorides in urine is performed as follows: to 10 drops of a 24-hour specimen of urine is added one drop of 20 per cent. potassium chromate solution; this gives a canary yellow colour. Silver nitrate (2·9 per cent. solution) is added drop by drop until the colour changes suddenly to brown. The number of drops of silver nitrate equals the amount of sodium chloride in grammes per litre. *Charles Wilcocks.*

SNELL, T. B. **Hyperpyrexia superimposed upon an Attack of Acute Tonsillitis.**—*Lancet.* 1943, June 5, 710, 1 chart.

The patient, a man of 24, was treated in the sick bay of a large warship stationed in the tropics. The temperature in the sick bay was between 90°F. and 100°F. in the daytime, and did not fall at night because hatches and scuttles were shut for blackout purposes. The tonsillitis cleared under treatment, but on the fourth day his temperature was still high and he was delirious. On the fifth day his temperature rose to 107°F. and he had ceased to sweat. He was laid on a table, with a wet sheet over his naked body and with electric fans playing over the sheet. As soon as possible he was immersed in a bath cooled by ice to 50°F., and within 15 minutes of immersion his temperature was down to 103°F. At this point he was removed from the bath and again covered with a wet sheet continuously fanned. In half an hour from first immersion in the bath his temperature was 97·8°F., and from that time recovery was continuous. [This case illustrates

several important points: the association of hyperpyrexia with febrile disease, the dry skin, the efficacy of cooling measures, and the importance of breaking off the drastic cooling before the temperature falls to normal.] *Charles Wilcocks.*

McGILL, A. F. **A Survey of Methods of Treatment of Tropical Ulcers.** *J. Roy. Army Med. Corps.* 1943, July, v. 81, No. 1, 16–23. [14 refs.]

This is a valuable paper, in which the author records observations on 156 cases of tropical ulcer in West African native soldiers stationed in Sierra Leone. He notes certain aetiological factors: Ulcers are more common in recruits, with less than 9 months' service, than in old soldiers; the diet of the troops, though better than that of the general population, is relatively low in protein, and it has been held that such a diet predisposes to ulcers; in the wet season, when fresh fruit is scarce, the incidence of ulcers rises; slight trauma provided the starting point of the ulcer in 58·3 per cent. of the cases; in a bacteriological investigation of 28 men, no organisms were cultivated from three, but staphylococci (*albus* or *aureus*) were recovered from 20, and Proteus from seven. The Kahn reaction was positive in 57·1 per cent. of 56 men tested.

[It is interesting to note that the diet of these men contained palm oil and kola nuts. ERASMUS [this *Bulletin*, 1943, v. 40, 331] reported that although tropical ulcer was relatively common in East African native troops during the campaign in Abyssinia, it was not observed in those West African soldiers whose diet included generous supplies of palm oil and nuts.]

Certain preventive measures are advised: Iodine and strapping should be applied immediately to all wounds [presumably this refers only to superficial wounds]. No injury treated in this way by the author developed into tropical ulcer. Boots and puttees should be worn on all parades, fatigues and marches. The protein content of the diet should be raised.

Various methods of local treatment were tried and compared; that which gave the quickest healing, and which is now advocated, is as follows:—

"(1) Small ulcers under 2·0 cm. diameter were treated by zipp and elastoplast changed every seven days until healed.

"(2) Medium ulcers of approximately 2·0 cm. to 4·0 cm. diameter were cauterized with 5 per cent. $AgNO_3$ for three minutes; this was washed off with saline; then zipp and elastoplast employed until clean; finally either daily or every other day dressing with cod liver oil or daily application of triple dye solution was done.

"(3) Large ulcers over 4·0 cm. diameter were treated with zipp and elastoplast until clean (seven to ten days) and then by Thiersch graft or by immediate excision of ulcer and scar tissue (best for chronic ulcers) followed by immediate Thiersch graft."

NOTE.—(*a*) Zipp ...	Zinc oxide and iodoform	... 1 part each
	Soft yellow paraffin ...	... 2 parts
(*b*) Triple dye...	Crystal violet	... 0·2 per cent.
	Acriflavine	... 0·2 per cent.
	Brilliant green	... 2·0 per cent.
	Aqueous solution.	

For ulcers involving the toe nails, the nail is removed, its bed is cauterized for 3 minutes with 10 per cent. silver nitrate and is then

washed with saline. Zipp dressings are applied daily until the ulcer is clean, and then either triple dye daily, or C.L.O. [presumably cod liver oil] every second day, is applied until healing is complete.

Patients with ulcers were given cod liver oil, calcium lactate, marmite and ascorbic acid. Treatment with arsenic, of those patients whose Kahn reactions were positive, did not influence the rate of healing.

It is noted that during 1941 no European soldier was admitted to the unit with tropical ulcer. *Charles Wilcocks.*

BETTLEY F. R. **Desert Sore : a Preliminary Study.** *J. Roy. Army Med. Corps.* 1943, Sept., v. 81, No. 3, 107–12.

This paper is based on the experiences gained in a General Hospital to which cases were sent from the Western Desert. The sores occur principally on the dorsal aspects of the hands and forearms and on the elbows. Other areas are much less commonly affected. Whilst some lesions seem to have arisen spontaneously, the great majority of patients give a story of a scratch or graze or insect bite. The early lesion is a flaccid intra-epidermal vesicle 2 to 5 mm. in diameter containing thin sero-pus and surrounded by a narrow margin of erythema. During the next two days the lesion grows until it attains a diameter of 1 to 3 cm. The roof of the circular bulla has by now ruptured in most cases, leaving a red eroded surface whose peripheral edges are still covered by the remains of the roof. This residual margin of the raised superficial layers of the epithelium is undermined and can easily be detached. Pus tends to form small pockets in the edge. A few days later the sore has become covered by a yellow crust, the sore itself being only superficial and having no true ulcer formation. Folliculitis is not uncommon, and many patients show some regional adenopathy, with occasional low pyrexia and malaise. In fact, as the author states, the disease is a form of impetigo in which the formation of bullae is rather more obvious than usual. In support of this contention, are the fact that the sores are very often associated with impetigo of the face, and that ecthyma may ensue, particularly on the legs and it is also to be noted that the bacteriology of the two diseases seems to be identical. Simple remedies cure the sores, eusol dressings or 3 per cent. sulphanilamide in vaseline having been most frequently used. In desert conditions the disease spreads rapidly throughout any body of men so that the isolation of recognized cases would seem to offer the best means of prophylaxis ; when this is impracticable the lesions may be covered with elastoplast strapping.

Sydney Thomson.

GROSPERRIN & MAURIC. L'appendicite chez les noirs. [**Appendicitis in Negroes.**] *Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* Brazzaville. 1943, Jan., v. 2, No. 1, 43–52.

Short notes are given of 29 cases of appendicitis in negroes which were operated upon in the Brazzaville hospital between August 1941 and September 1942. All the patients recovered. The symptomatology is very similar in the negro to that in the European, but there are some differences : local pain is less acute and there is rarely local hyperaesthesia ; the temperature is not high even in cases where an abscess is found at operation. The commonest form met with in hospital has local peritonitis and a circumscribed abscess ; this is because the native delays to report in the early days of the attack.

The authors have never seen a case of generalized peritonitis in a negro and suggest that this resistance is connected with the intense intestinal parasitism which is almost universal from an early age. [See also this *Bulletin*, 1937, v. 34, 393; 1935, v. 32, 244; PALES, L. *Annales d'Anat. pathologique*, 1934, v. 11, 563.] *J. F. Corson.*

WILKINSON, H. **The 1942 Anti Mosquito Campaign in Bermuda.** *Mosquito News.* New Brunswick, N.J. 1943, Mar., v. 3, No. 1, 6–9.

In 1941 there was an epidemic of dengue in Bermuda, and it was decided to conduct a campaign against the vector, *Aëdes aegypti*, not only to prevent further outbreaks of dengue, but also as a precaution against the possible introduction of yellow fever, and, in fact, against all mosquitoes. Fifty British and American soldiers or sailors were appointed inspectors, and the island was divided into fifty areas. Tanks were inspected and screened, or supplied with fish, rock cisterns filled or punctured, gutters straightened, needless receptacles and trash cleared, water-containing plants (especially red-hot-poker plants, which hold a gill of water and provide excellent breeding places) were uprooted, and much undergrowth was cut away. Swamp drainage was effected by trenching.

Public interest was stimulated in this campaign, which will need to be intensified after the cool period of the year, during which maintenance was carried on by a squad of eight men. The residents are co-operating well. There had been, as a result of these measures, a great reduction in the numbers of mosquitoes trapped, indicating considerable success in the campaign. The mosquitoes caught were *Aëdes aegypti*, *Culex fatigans*, *Aëdes sollicitans* and *Aëdes taeniorhynchus*; the first two are domestic breeders, the last two are salt marsh mosquitoes.

Charles Wilcocks.

WHITE, R. Senior. **Effect of Reduction of Surface Tension on Mosquito Pupae.** *Indian Med. Gaz.* 1943, July, v. 78, No. 7, 342.

MANZELLI [this *Bulletin*, 1943, v. 40, 335] found that mosquito pupae could not live for more than a few hours in water containing concentrations of soap of 1 : 1000 or more. The pupae could not maintain their balance, owing to lowered surface tension, and turned on their sides. Senior White made similar experiments with pupae of *Aëdes aegypti*, using dilutions of a saturated bar-soap solution. With Calcutta tap-water no result was obtained in dilutions over 1 : 300 and with double distilled water no result in dilutions over 1 : 600. The method would be useless for the very hard water of the Calcutta wells. [See also this *Bulletin*, 1943, v. 39, 427.] *J. F. Corson.*

BOOK REVIEWS.

MANSON-BAHR, Philip [C.M.G., D.S.O., M.D., F.R.C.P., Senior Physician to the Hospital for Tropical Diseases, Royal Albert Dock and Tilbury Hospitals, etc.]. **The Dysentery Disorders. The Diagnosis and Treatment of Dysentery, Sprue, Colitis and other Diarrhoeas in General Practice.** With an Appendix by W. John MUGGLETON, M.S.M., F.I.M.L.T., Technical Assistant. 2nd Edition. pp. xiv+629. With 9 colour and 14 black & white plates & 108 illustrations in the text. 1943. London, Toronto, Bombay, Melbourne and Sydney: Cassell & Company, Ltd. [30*s*.]

A second edition of "Dysenteric Disorders" within four years of its original publication is sufficient proof of the niche which this book has already made for itself. The war has doubtless increased the demand for this volume, for the majority of the diseases which Manson-Bahr describes with such wealth of detail and first-hand knowledge are primarily infections of tropical or sub-tropical countries where many of our medical men are meeting them for the first time. They will find "Dysenteric Disorders" an almost indispensable *vade mecum*. Nearly one-half of the book is given to the infectious dysenteries (bacillary and protozoal) and includes recent work on the laboratory diagnosis of bacillary dysentery with selective culture-media and its treatment with sulphonamides, in particular sulphaguanidine. More emphasis might have been laid on the importance of convalescent and contact carriers in spreading the infection. The rectal swab, again in favour, was used extensively in the 1914–18 war, and clinicians are rediscovering the value of sigmoidoscopy in detecting persistent mucosal ulceration in apparently healthy convalescents. Prophylactic vaccination against bacillary dysentery is still a procedure of debatable utility: the next edition might include an account of the recent work on the antigens of the Shiga bacillus.

In amoebic dysentery with its protein symptomatology, the author reminds us that emetine, excellent for the treatment of the acute infection and liver abscess where the amoebae are in the vegetative phase, is ineffective against the cystic form, and should always be followed by a course of emetine bismuth-iodide supplemented, in chronic dysentery, by quinoxyl given rectally. The arsenicals (stovarsol or carbarsone) are more toxic and less effective. Repeated daily (4–8) stool examinations or sigmoidoscopy with scrapings from any ulceration may be necessary to establish the diagnosis in chronic dysentery. Giardia is accepted as an intestinal pathogen and may occasionally cause an acute steatorrhoea.

Ninety pages, with a new chapter on pellagra, are given to the steatorrhoeas, and the common factor of a vitamin-deficiency in pellagra, sprue, coeliac disease and idiopathic steatorrhoea is shown. The aetiology and treatment of mucous and ulcerative colitis are completely discussed. A variety of other conditions which may more rarely produce dysenteric symptoms are described, and two excellent appendices give descriptions of the intestinal amoebae and of laboratory methods for the diagnosis of the dysenteries. The bibliography covers 30 pages and there is an adequate index.

Robert Cruickshank

REYNIERS, James A. [Edited by.] **Micrurgical and Germ-free Techniques. Their Application to Experimental Biology and Medicine. A Symposium.**—pp. xii+274. With numerous tables, diagrams and photographs. 1943. Springfield, Ill. and Baltimore, Md.: Charles C. Thomas; and London: Baillière, Tindall & Cox, 7 & 8 Henrietta Street, W.C.2. [$5.00; 27*s.* 6*d.*]

This book records the results of a colloquium held at the Laboratories of Bacteriology, University of Notre Dame, Indiana, in November 1939. The eleven chapters are contributed by seventeen American workers from various American laboratories. The first section deals with the design of micrurgical machines and the application of micrurgical techniques to the study of living cells (expecially interfacial reactions) and to botany, with special reference to phytopathology. The second section, comprising about two-thirds of the book, deals with germ-free techniques and their application to the rearing of germ-free mammals and chickens, with the use of the mammalian foetus as an experimental animal, with the germ-free culture of protozoa, nematodes and insects and with the use of germ-free plants and parts of plants for physiological and pathological studies. Three articles follow on the control of cross-infections among limited populations (including infants in nurseries and hospitals) and on air-borne infections and the use of ultra-violet light and mechanical barriers against air-borne infection.

A short review cannot do justice to the valuable information contained in all these articles. Excellent photographs of the often elaborate and complicated apparatus described are numerous throughout the book and the many diagrams help the inexpert to understand the principles of their construction and use. The reader who has not been able to follow the development of these specialized techniques will be amazed at the extraordinary ingenuity and painstaking labour which has evolved them. The bibliographies of each article will enable him to read more extensively the literature of each section. The editor says that later symposia will be held and it is to be hoped that his intention to publish their results will be possible. It is remarkable that it has been possible to publish, during this war, a book that is so well produced and so fully illustrated. The publishers are to be congratulated. *G. Lapage.*

TAYLOR, Frank H. [F.R.E.S., F.Z.S.]. **Mosquito Intermediary Hosts of Disease in Australia and New Guinea.** *Commonwealth of Australia Dept. of Health. Service Publication* (*School of Public Health and Tropical Medicine*). *No. 4.* 1943. June 15. 154 pp. With 1 diagram & 75 figs. (2 maps). Glebe, New South Wales: Australasian Medical Publishing Company Ltd., Seamer Street.

It seems that the author has set out to produce a single small book, which could be used by a man who had no specialized knowledge of mosquitoes. Such a man, for instance an entomologist on active service, would find this book of very great value. With it, and without other documents, he could make critical identifications of those mosquitoes which may be concerned with the transmission of human diseases in Australia and New Guinea. The author is therefore to be congratulated on carrying out his purpose.

The book deals in an exceptionally full manner with anatomy of adult and larva, especially those points used in taxonomy. It

covers the Anophelines more fully than the Culicines (because so many Culicines are not likely to be carriers of disease and are therefore omitted). This is followed by accounts of the several species, their external characters (male, female and larva), distribution, and relation to disease: the treatment of biology is adequate. Maps show the distribution in Australia of the species of *Anopheles* and of *Aëdes aegypti* (which is found in all towns except in the extreme south and the remote centre). The map dealing with *Anopheles* also indicates the distribution of "endemic malaria" which is shown as limited to two small areas in North Queensland, and three inland in the Northern Territories: it is not shown from any part of Western Australia, in which respect the author seems to differ from CILENTO [*Tropical Diseases in Australasia*, 2nd Ed., 1942, p. 2; see this *Bulletin*, 1943, v. 40, 569].

One might wish that the author's point of view had been more definitely Australian, and that he had given an account of malaria in the western Pacific in place of a page of excerpt on malaria in Britain. We feel also that he has borrowed too freely, though always with acknowledgment, from classical writers (CHRISTOPHERS and EDWARDS), and that the extracts are not always quite appropriate; for instance, it gives a feeling of lack of continuity to read details about the biology of *Aëdes aegypti* in Northern Nigeria, or Kampala (several pages being quoted from EDWARDS, 1941, *Mosquitoes of the Ethiopian Region*). It is facts from Australia and that part of the world that the reader wants.

It is much to be hoped that Australian entomologists will give detailed attention to *Anopheles punctulatus* and its variety *moluccensis*, which should be critically studied with due regard to male terminalia, pharynx, larval chaetotaxy and so forth. If the variety differs *only* in certain details of pattern, then the malariologist may treat it as *punctulatus*: but if there are other structural differences, or biological differences, then large questions of the relation of *moluccensis* to malaria demand study. *P. A. Buxton.*

The news has been received with great regret of the death on December 19th, 1943, of Sir ARTHUR HORN, who had been a keen and helpful member of the Honorary Managing Committee of the Bureau since his appointment in 1924.

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